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Submit as an artachment a copy of the dease for use of said factlify and/or site property, as appropriate; and is

Acabove: state: "same as applicant." It different from the applicant, please note that the owner is required to sign the application on page 5.

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Type of Peri	il'Application f y y
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2. Amendmen	X North Number: 30347

Denote your TDWR Solid Waste Registration Number.

Indicate by service the permit number s) in the appropriate column below a subjects indicate permits or construction approvals which permate to polity time controls or industrial solution was emanagement activities conducted by your plant or at your location a Complete each blank by entering the permit mumbers or the dates of application. Or throught

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of Other relevant environmental permits		A STATE OF THE LAND

Use the following acronyms for each agency as shown

TOWN := Lexas Department of Water Resources

= Texas Air Control Board Commission

Texas Department of Health:

Lexas Department of Agriculture

U. S. Environmental Protection Agency

S. Army Corps of Engineers

Fmy Corps of Engineers

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ASSEMBLY AND FINISH PAINTING OF AUTOMOBILES

the principal products and/or services which are provided and planny. Please itemized by Standard Industrial Classific

ได้บังเกิดเลียงสู่หัวเป็นที่สู่เทิสเติดใหล่ย_{ะ ค}

Edcation of Site

TAGET I LY Name GENERAL MOTORS ASSEMBLY DIVISION

Street Address, if available: 2525 EAST ABRAM

ARLINGTON, TEXAS COUNTY TARRANT

Are your waste management operations within the extraterritorial c signisdiction of a municipality?

English State of the State of t

- Fit you checked "yes," what municipality? ARLINGTON
 Give a verbat description of the location of the facility. with respect to known or easily identifiable landmarks. APPROXIMATELY ONE AND ONE QUARTER MILES SOUTH OF SIX FLAGS OVER TEXAS AMUSEMENT PARK
- Detail the access routes from the nearest U.S. or State Highway to the facility site... ONE HALF MILES SOUTH OF 1-30 AND FOUR MILES NORTH OF 1-20

Submit as Artachment A' we undeed States Geological Survey (USGS)

7. minute quadrangle map of Indicate on this map the location:

of the site and the land use parterns of the areas within ! mile

thought of the site boundaries ledge, residential, commercial. recreationals agricultural undeveloped etc. Each area of land use should be labeled on the map. [Note: If such a map sinch available submitte substitute map such as a State Department of Highways and Public Transportation county map with sufficient scale to adequately show the Schelboration and surrounding land use parterns.

Gt a property of cells of long some a track of the names and most from code eases of all had locens landowners and other nearbound of the following swing in dark consider themselves at rected by the state of the s the selection of the map through the use of appropriate keying recurrence, and the map should be a uses map, and the county or another map or drawing with a scale adequate enough? to show the cross-referenced affected landowners.

blading cate from what source is the pames and addresses of persons

Providentified as affected were obtained:

County
County
School District
Water District
Abstract County
Office Specify Flore book

Enter the geographical coordinates of the site

8. Is the facility. Docated on Endian Lands (Check, one:

B. Legal Description of Site

Submit as Aftachment C' a legal description of the entire tract of land upon which the waste management operations referred to in this permit application occur or will occur.

Site Environmenter and technical Information 1.3

Chesumative and Hydrabiscone

is any portion of your waste management tacklity site fincluding proposed, active, and inactive portions and ject to flooding from adjacent dividearby surface water bod as under the tukkowling conditions.

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idicate the corresponding water uses below

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Process water

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erigation water for human food crops

e any adjacent or hearby surface waters utilized by the applicanta.

LL you checked "yes " indicate the corresponding water uses

(1) Industrial uses:

Acooling water () Fig. () Fig. ()

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2) - Potable Contribution (water)

April 121 (titled) inside

a luarton Water JoE II vestock rood/crops o⊨ drazing

Livestock watering

trangation waters for human food crops

Land use and Subsidence informations

or from of sthe overall, site property utilized for and All of the Book of the letters

my partners of the overall site property subject to land: upsidence?

Yes X ANO

TIE WASTES AND WASTE MANAGEMENT

. Waste General ion and Management Activities.

[seny_hazardous_industrial_solfd_waste.[see Title 40] Gode of Federa Regulations, Rar = 26/1 presently or proposed to be generated at your

r A Yes ∏ # No

lif you checked inc. 'go to Section !!!.B.2. below.

Lo you checked "yes," answer the following question.

L. Are you presently registered with TDWR as a solid waste generator?

The state of the s

A res No

If you checked "no," contact the Solid Waste Section of TDWR

Also, Contact the Solid Waste Section of TDWR in Austin, lexas to obtain registration information. Also, continue with the application form (go to Number 2 below).

Rt you checked "yes," go to Section I, of your Notice of Registra-tion, determine which of your wastes are bazardous, and hist these wastes landing xfures to Table Lul-Dusee Number 2 below)

Complete of early in Delowing besting only nazardous wastes and all knowledge of the property of the property

In this lable, "TOWR Sequence Number! refers to the number in the learn-hand columns in Sections of a vour Notice of Registration (Note: You are han requestered with IDWR enters!NAME for TOWR Sequence Number venos I DWR: Waste Code Number 4

FOR THE LEASE AND LONG STOLEN, INDICATED IN A FEW NUMBERS ASSESSED. CF el sus established i de la companya Companya de la compa

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ach waste and wastermix (use) (stee) in table (0)-12that is presently or proposed to be managed on—site provide the summary and shown like the summary and state of labels of table and submits the completed sets of tables as "Attachment D").

Table III-I Generated Hazardous Wastes and Management Activities

Description 2	TOWN TOWN	EPA EPA : Hazard Hazardona :- Off-Site :		Ahnual SIC Quantity Code Generated and
	umbi Windows	Code Waste No. 35 Disposal F006 F009	Storage Processing Disposal	(Ibs) Process
*PAINT SCUDGE	ie Giro	(817) 34201/ (70)18 X	A CONTRACTOR OF THE PARTY OF TH	1,308,060 SPRAY PAINTING.
-WASTE OTES AND GREASES	e CEE			84,000gal SOVERFILL SPILLAGE
SALT BATHUSLUDGE	r iorge	3144 3000 X		26:400gal GLEAN STRIPA VK
WASTE THANNER	63000	750 110002-117240 X	Transfer	SULUDOGATE GLEAN PAINT LINES
		<u> </u>		
		and the second		
		CONTRACTOR OF THE STATE OF THE	AND THE PERSON NAMED IN COLUMN	

Storage means the interim containment or control of waste after generation and prior to ultimate disposal

Processing a means the extraction of materials transfer, volume reduction conversion to energy, or other separation and preparation of toolid waste for reuse or disposal, including the treatment or neutralization of hazardous waste so as to render such waste nonhazardous, lafer for transport, amenable for recovery, amenable for storage, or reduced volume. The "transfer" of solid waste for reduced volume as used above, does not include the actions of a carrier in conveying or transporting solid waste by truck, ship, pipeline, or other means.

- Table []]-2:Hazardous Waste Management Fact [] by Component Summary Sheet

-Verbal Description of Waste		PAINT SLUDGE	
Process (see Fast column sen i	able spicing is	SPRAY PAINTING.	
TOWN Sequence Number of Weste	liu assumedi.		
ingicale line sacing a company	nts vised for sto	.age/processing/dispo	sal of the above-
is managed and the state of the	he number of suc	n lacility components	by which this was
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Lagoon/Ponds, Urined's		J Pandspreading A	ea
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Basin (earthen; above-gra		Flood trrigation	ı Area
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Table III-2 Hazardous Waste Management Facility Component Summary Sheet

Verbal Description of Waste	WASTE OILS AND GREASES
Process (see last column in Table III-I)	OVERFILL SPILLAGE
TDWR Sequence Number of Waste (if assigned)	
Indicate the facility components used for sto specified waste by entering the number of suc is managed.	
Lagoon/Pond (unlined)	Landfarm
Lagoon/Pond (lined)	Landspreading Area
Basin (earthen, above-grade lined)	Spray Irrigation Area
Basin (earthen, above-grade unlined)	Flood Irrigation Area
Basin (earthen, below-grade lined)	Septic Tank/Drain Field
Basin (earthen, below-grade unlined).	Injection Well
Basin (concrete, above-grade lined)	Tank (surface storage)
Basin (concrete, above-grade unlined)	Tank (sub-surface storage)
Basin (concrete, below-grade lined) .	Tank (surface processing)
Basin (concrete, below-grade unlined)	Tank (sub-surface processing)
Basin (other)	Tank (other)
Pit (lined)	1 Drum Storage Area (open)
Pit (unlined)	Drum Storage Area (enclosed)
Incinerator	Drum Storage Area (other)
Open Controlled Incineration Area	Bulk Storage Area (open)
Boiler (energy-producing)	Bulk Storage Area (enclosed)
Landfill (sanitary)	Bulk Storage Area (other)
Landfill (surface, open)	Other (specify
Landfill (other))

Table III-2 Hazardous Waste Management Facility Component Summary Sheet

waste

Verbal Description of Waste	SALT BATH SLUDGE
Process (see last column in Table III-I)	CLEAN STRIP TANK
TDWR Sequence Number of Waste (if assigned)	12
Indicate the facility components used for sto specified waste by entering the number of suc is managed.	
Lagoon/Pond (unlined)	Landfarm
Lagoon/Pond (lined)	Landspreading Area
Basin (earthen, above-grade lined)	Spray Irrigation Area
Basin (earthen, above-grade unlined)	Flood Irrigation Area
Basin (earthen, below-grade lined)	Septic Tank/Drain Field
Basin (earthen, below-grade unlined).	Injection Well
Basin (concrete, above-grade lined)	Tank (surface storage)
Basin (concrete, above-grade unlined)	· Tank (sub-surface storage)
Basin (concrete, below-grade lined) .	Tank (surface processing)
Basin (concrete, below-grade unlined)	Tank (sub-surface processing)
Basin (other)	Tank (other)
Pit (lined)	1 Drum Storage Area (open)
Pit (unlined)	Drum Storage Area (enclosed)
Incinerator	Drum Storage Area (other)
Open Controlled Incineration Area	Bulk Storage Area (open)
Boiler (energy-producing)	Bulk Storage Area (enclosed)
Landfill (sanitary)	Bulk Storage Area (other)
Landfill (surface, open)	Other (specify
Landfill (other)	

Table 111-2 Hazardous Waste Management Facility Component Summary Sheet

Verbal Description of Waste	WASTE THINNER
Process (see last column in Table III-I)	CLEAN PAINT LINES
TDWR Sequence Number of Waste (if assigned)	NONE
Indicate the facility components used for st specified waste by entering the number of su is managed.	· · · · · · · · · · · · · · · · · · ·
Lagoon/Pond (unlined)	Landfarm
Lagoon/Pond (lined)	Landspreading Area
Basin (earthen, above-grade lined)	Spray Irrigation Area
Basin (earthen, above-grade untined)	Flood Irrigation Area
Basin (earthen, below-grade lined)	Septic Tank/Drain Field
Basin (earthen, below-grade unlined).	Injection Well
Basin (concrete, above-grade lined)	Tank (surface storage)
Basin (concrete, above-grade unlined)	Tank (sub-surface storage)
Basin (concrete, below-grade lined) .	Tank (surface processing)
Basin (concrete, below-grade unlined)	Tank (sub-surface processing)
Basin (other)	Tank (other)
Pit (lined)	1 Drum Storage Area (open)
Pit (unlined)	Drum Storage Area (enclosed)
Incinerator	Drum Storage Area (other)
Open Controlled Incineration Area	Bulk Storage Area (open)
Boiler (energy-producing)	Bulk Storage Area (enclosed)
Landfill (sanitary)	Bulk Storage Area (other)
Landfill (surface, open)	. Other (specify
landfill (other)	î .

Has the applicant at any lime conducted the on-site storage. processing, or disposal of industrial solid waste now identified Coralisted as hazardous waster

X Yes was No. 1

is life your checked "yes," complete labiter it - y indicating the hazard— telegrandustrial solid wastermapagement facility.components which a published but are non-tonger, in service e once u un red at your iprant eare but are no conder in servicet is established factor of someonenes.

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For Back lace Bity compodent indicated in Table Fit—Z (Attachment Disanditable of Each Complete The For Jowing Table Fit—4 artaching additional copies as necessary. Enter the name of each facelity component as specified in the earlier tables.

Give the design capacity of each facility component in any of the units shown in the case of Inactive facilities for which design details are unavailable, an estimate of the design capacity is—

sufficient.

Flease nate that each facility component should be described, in Evolutiown words and the Fine provided for "verbal description." Browne an estimate of the foral weight (lbs) of hazardous thouse thou sold a wasks materials that has been disposed obtandon. Sidner of him four spie boundaries and not removed to another sid 4 102958-40110/68

ation of Waste Management Fact full les and Components

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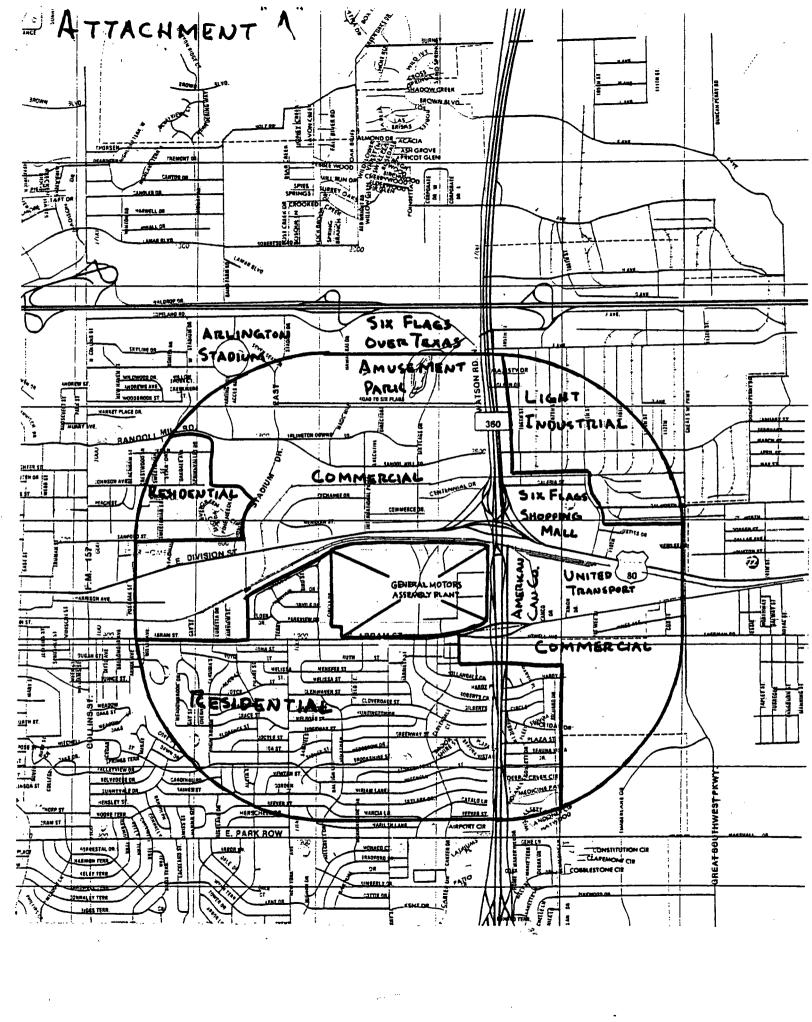
Jable 1-4 Hazardous Waste Facility Components List

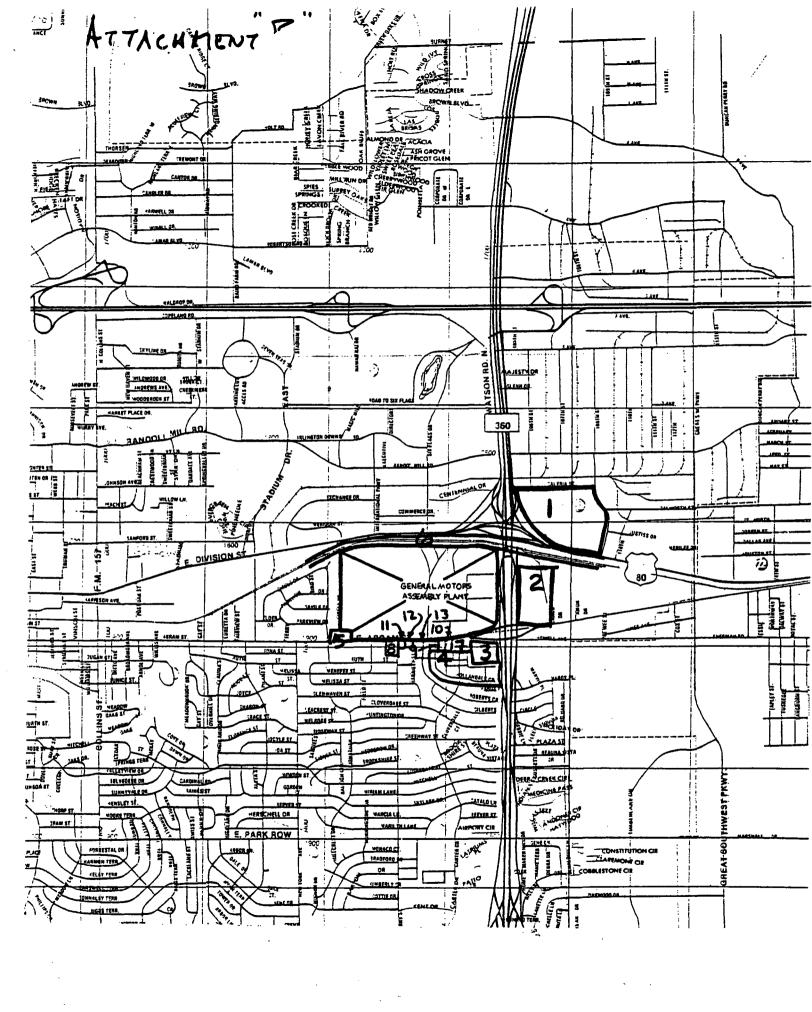
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- to. The overal facility and all surface intake and discharge
 - c. (All injection we'rs where liquids are injected underground;
- and bereholes within the property of boundaries obtine overall plant/sile; and
 - e Atl wells springs, other surface Water podies, and drinking water wells within the map area and the purpose for which each water well is used to domestic livestock agricul— fund; industrial etc.):
 - 2. Submit as "Attachment F" photographs which clearly delineate all hazardous waste facility structures and storage, processing, and disposal areas, as well-as sites of future storage, processing and disposal areas.
- D. Frow Diagram/Description
- Show as "Attachment G" process flow diagrams or step-by-step word descriptions of the process flow, depicting the handling, collection, storage, processing rand/or disposal of each of the hazardous wastes previously listed in this application.
- / [herrlow dragrams or descriptions should include the following.
 - In the property of the propert
 - Means of conveyance unitilized in every step on the process (Flow:
 - A Name and Eurofton of each facility component through which the
 - 44 Distribute of sport tomot all mastes the off-site specifys

Listrand index below all antachments to this application and indicate in included or not included:

() tem	Mandatery Attachments	Not Affachment Included Included
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WEST OF A PERSON	Avvected Janoowners	A PART AND X
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	Hazardons waste facility componen	
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PILLC.2.	Photographs Process flow diagram/description.	
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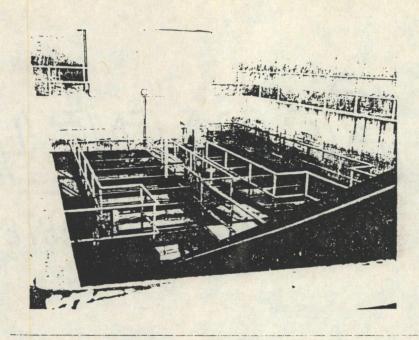
ATTACHMENT "B"

- 1. Six Flags Mall Shopping Center 411 Six Flags Mall Arlington, Texas 76010 817/640-1641
- 2. American Can Co. 2801 East Abram Arlington, Texas 76010 817/649-3381
- 3. K-Mart Discount Store #4132 2540 East Abram Arlington, Texas 76010 817/277-1376
- 4. Hollandale House Apartments 221 Hollandale Circle Arlington, Texas 76010 817/265-7111
- 5. Tanglewood Apartments 2015 East Abram Arlington, Texas 76010 817/274-2011
- 6. Texas & Pacific Railroad T & P Building Fort Worth, Texas 76101 817/332-3201
- 7. Fas Gas #2 2530 East Abram Arlington, Texas 76010 817/275-9280
- 8. Seven Eleven #94 2120 East Abram Arlington, Texas 76010 817/274-2381
- 9. Comet One Hour Dry Cleaning & Laundry 2500-C East ABram Arlington, Texas 76010 817/277-2491
- 10. Intercity Draperies 2504 East Abram Arlington, Texas 76010 817/265-1011

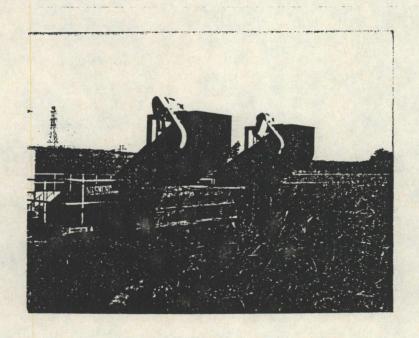
ATTACHMENT "B" (cont'd)

- 11. Kountry Pit Bar B Que 2200 East Abram 817/274-3211 Arlington, Texas 76010
- 12. Ace of Clubs 2204 East Abram Arlington, Texas 76010
- 13. Myers & Associates
 Republic National Bank Building
 Dallas, Texas 75201
 214/744-4731

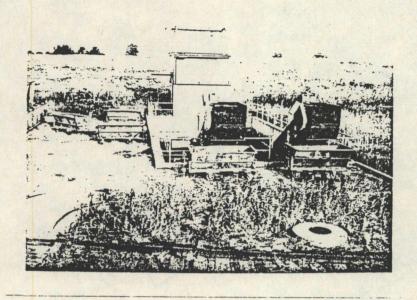
ATTACHMENT F



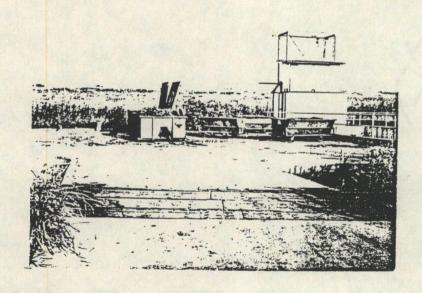
DUPLEX GRIT SEPARATORS



GRIT SEPARATOR CONVEYOR DUMP INTO GONDOLAS

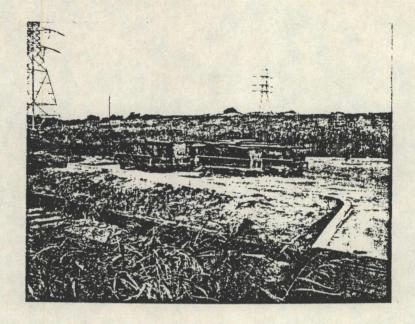


OVERALL VIEW OF DUPLEX GRIT SEPARATORS



GONDOLAS AND LARGE SLUDGE CONTAINER

ATTACHMENT F"

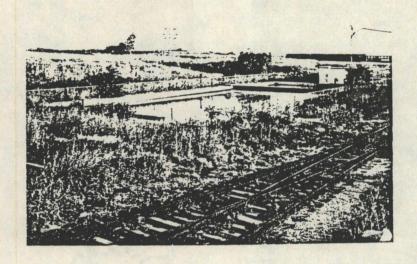


SLUDGE GONDOLAS

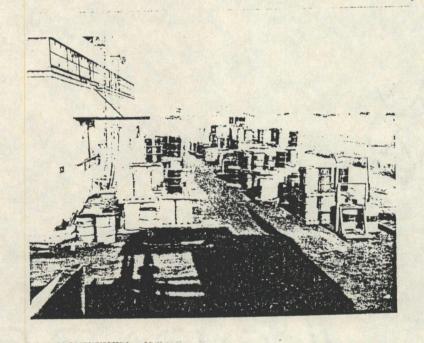


OVERALL VIEW OF SLUDGE GONDOLAS AND HANDLING AREA

ATTACHMENT F"



BELOW GRADE CONCRETE BASIN (UNLINED)



DRUM STORAGE AREA

ATTACHMENT "G"

PAINT SLUDGE 150110

Originates in spray booth as overspray which is removed from the air stream by water scrubbers and flows through the trade waste sewer system to grit separators. The grit separator removes the paint sludge by means of drag conveyors and skimmers and deposits it into portable sludge gondolas which, when full, are emptied into larger containers. When large container is full it is transported by truck to an off-site disposal area. The large container is emptied and then returned to our facility.

WASTE OILS AND GREASES 210450

Originates in numerous pits and trenches throughout our facility as spillages and overflow from automotive fluid filling operations. Waste fluids are pumped into a large portable tank and then transferred to drums which are accumulated in a drum storage area until there is sufficient quantity to fill a tank truck. The wastes are pumped out of the drums into a tank truck which transports them to an off-site disposal area.

SALT BATH SLUDGE 170320

Originates when a molten salt bath paint stripping tank is periodically cleaned. The sludge is emptied into barrels which are accumulated in the drum storage area and then hauled off by truck to an off-site disposal area.

WASTE THINNER 104000

Originates when paint lines are periodically flushed out with paint thinner and is emptied into drums which are accumulated in the drum storage area. Drums are pumped into a tank truck and then hauled to an off-site disposal area.

NOTE:

The off-site disposal area referred to above is a licensed and approved disposal site.

Investment Survey

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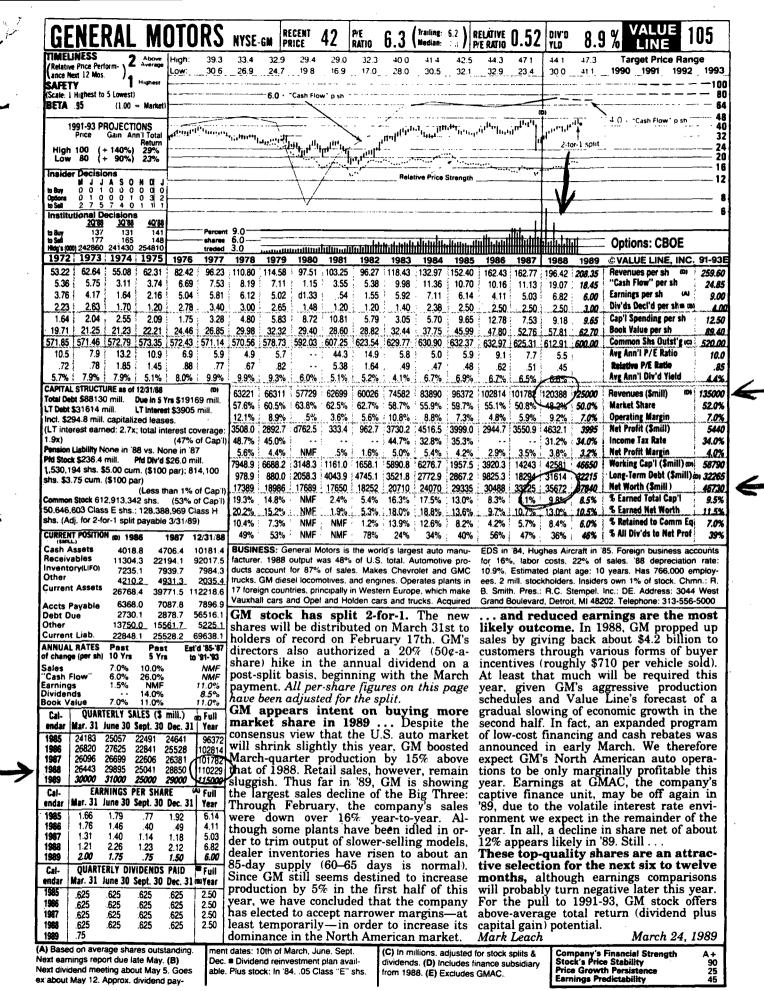
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SUPPLEMENTARY REPORTS 2	
★ Rank highest for Timeliness. ★Rank above average.	

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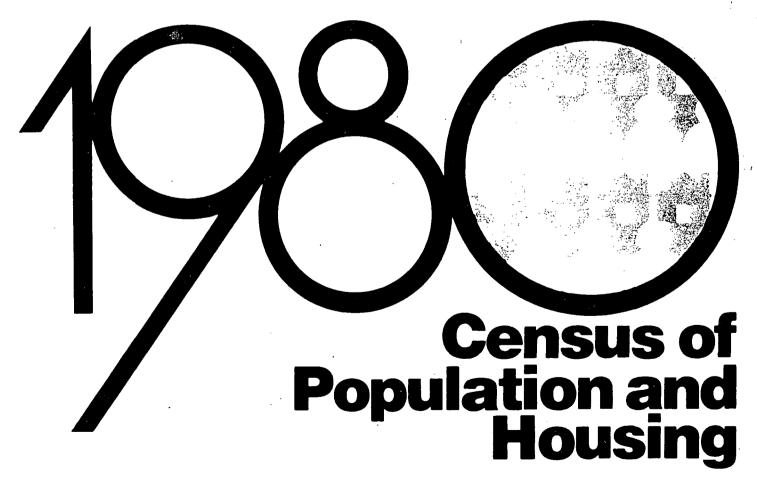


Census Tracts

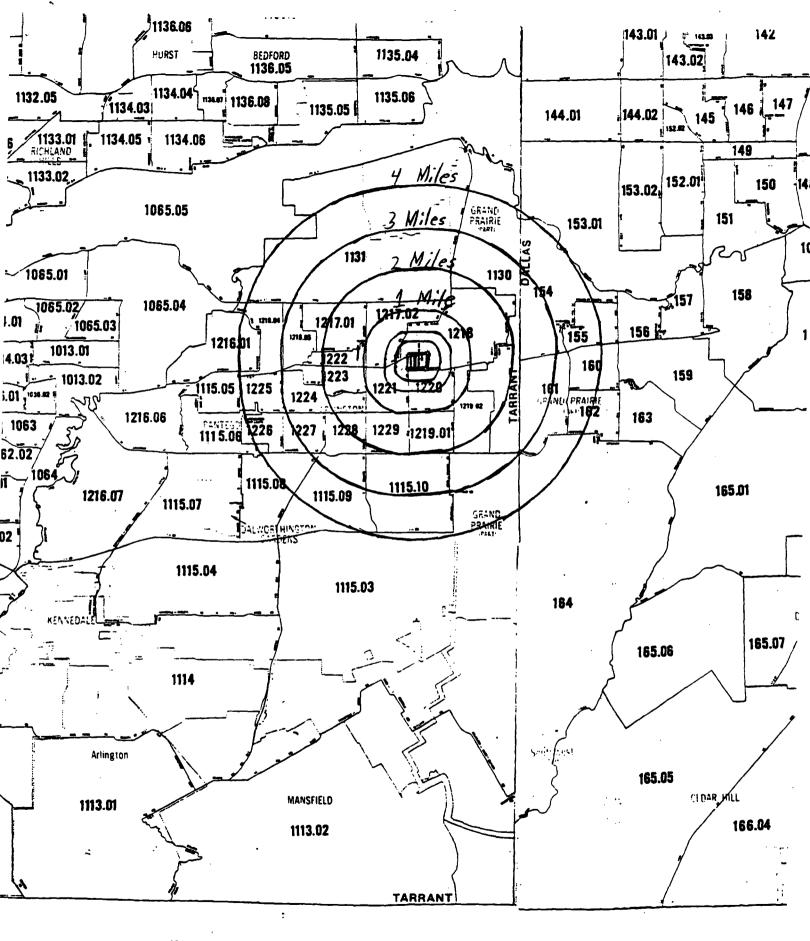
DALLAS-FORT WORTH, TEX.

STANDARD METROPOLITAN STATISTICAL AREA

Section 1 of 2



U.S. Department of Commerce BUREAU OF THE CENSUS



1980 CENSUS TRACTS

DALLAS-FORT WORTH, TEX.

STANDARD METROPOLITAN STATISTICAL AREA

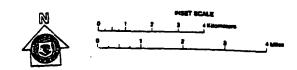


Table P-1. General Characteristics of Persons: 1980—Con.

[For meaning of symbols, see Introduction. For definitions of terms, see appendixes A and B]

Consum Towards	Garland city	d city (pt.), Dallas CountyCon. Grand Prairie city (pt.), Dallas County												
Census Tracts	Tract 0190.13	Fract 0190.14	Tract 0190.15	Tract 0153.01*	Tract 0154	Tract 0155	Tract 0156	Tract 0157	Tract 0158	Tract 01599	Tract 0160	Tract 0161	Tract 0162	
AGE											_			
Total persons Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 20 to 24 years 25 to 34 years 35 to 44 years 45 to 54 years 55 to 64 years 55 to 64 years 75 years and over	4 060 466 385 285 285 414 650 844 399 239 150 105 123	4 698 408 501 491 480 322 924 740 466 256 68 42	7 262 568 669 711 807 743 1 309 1 194 722 321 164 54	2 586 189 189 146 160 277 462 268 335 317 176 67	8 630 608 597 662 819 736 1 359 1 203 1 071 979 377 219	2 781 259 209 187 255 374 514 226 221 216 188 132	4 190 455 365 339 325 479 733 377 362 409 260 86	3 035 324 306 311 307 309 504 313 240 233 134 54	2 446 213 211 193 214 254 460 328 268 188 101 36	2 718 301 268 195 217 296 446 223 183 282 207 95	6 061 569 527 457 481 636 1 024 598 532 587 405 245	3 004 224 302 319 335 257 416 345 344 243 153 66	6 131 424 532 616 617 483 945 946 789 541 165 73	
3 and 4 years 16 years and over 18 years and over 21 years and over 60 years and over 62 years and over	2 874 2 729 2 381 304 270 23.6	169 3 193 2 993 2 762 197 163 27.0	229 5 170 4 828 4 351 357 297 25.9	70 2 021 1 964 1 851 381 322 31.2	244 6 606 6 288 5 794 1 010 825 31.8	106 2 080 1 988 1 798 438 397 26.5	173 2 966 2 837 2 640 535 453 26.3	120 2 034 1 915 1 729 291 243 24.3	85 1 803 1 718 1 595 219 180 27.9	107 1 915 1 839 1 681 442 393 26.0	221 4 414 4 219 3 923 932 813 28.0	97 2 084 1 952 1 768 313 271 26.5	183 4 446 4 167 3 842 447 339 29.1	
Femals Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 25 to 19 years 25 to 19 years 25 to 34 years 35 to 44 years 45 to 54 years 45 to 54 years 55 to 64 years 55 to 64 years 57 years	2 174 238 196 147 235 334 421 206 128 99 68 102	2 419 192 251 226 226 177 508 392 236 138 40 33	3 593 270 323 352 373 344 697 587 349 174 89	1 336 90 101 72 87 136 219 140 178 177 90 46	4 419 296 297 331 440 359 676 604 544 497 204 162	1 431 139 107 83 144 168 258 112 113 118 106 83	2 141 239 170 167 161 258 358 173 190 219 144 62	1 500 174 154 145 141 148 238 153 123 121 66 37	1 153 124 89 85 106 121 201 125 130 94 52 26	1 451 145 153 109 113 136 236 103 102 167 125 62	3 161 275 269 226 233 320 508 303 291 323 237 176	1 597 112 141 156 171 142 233 182 199 199 191 39	3 694 229 266 310 290 298 486 491 397 258 88 51	
3 and 4 years 16 years and over 18 years and over 21 years and over 60 years and over 62 years and over	91 1 570 1 484 1 300 223 202 23.9	87 1 699 1 597 1 496 116 100 28.3	107 2 580 2 413 2 202 196 170 26.8	36 1 056 1 028 956 213 177 31.9	114 3 403 3 223 2 985 582 491 32.2	56 1 078 1 027 923 261 235 27.1	88 1 533 1 463 1 368 305 262 26.5	68 1 000 940 857 160 133 24.5	51 832 794 731 115 95 26.7	50 1 024 981 905 269 237 26.9	114 2 340 2 252 2 109 574 499 29.5	49 1 147 1 082 988 183 159 28.0	104 2 245 2 107 1 948 226 182 29.7	
HOUSEHOLD TYPE AND RELATIONSHIP														
In householder Family householder Family householder Nonfamily householder Living dlone Spouse Other relatives Nonrelatives Inmare of institution Other, in group quarters	4 060 3 948 1 621 1 044 577 482 668 1 452 207 112	4 698 4 698 1 475 1 300 175 143 1 034 2 105 84	7 262 7 262 2 367 1 959 408 298 1 655 2 991 249	2 586 2 586 1 095 747 348 316 623 814 54	8 630 8 489 3 040 2 433 607 507 2 151 3 087 211 122 19	2 781 2 712 1 068 760 308 261 610 952 82	4 190 4 162 1 413 1 118 295 246 945 1 679 125	3 035 3 035 919 761 158 130 615 1 409 92	2 466 2 241 732 609 123 105 528 921 60 215	2 713 2 713 1 010 723 287 266 561 1 046 96	6 061 5 941 2 133 1 644 489 422 1 339 2 314 155 120	3 006 3 000 1 021 777 244 208 510 1 397 72 4	6 131 6 131 1 954 1 728 226 184 1 559 2 531 87	
Persons per household Persons per family	2.44 3.03	3.19 3.41	3.07 3.37	2.36 2.92	2.79 3.15	2.54 3.06	2.95 3.35	3.30 3.66	3.06 3.38	2.69 3.22	2.79 3.22	2.94 3.45	3.14 3.37	
Persons 45 years and over In households Householde Nontamily householder Living done Spouse Other relatives Nomelatives Inmate of institution Other, in group quarters	228 123 96 68 66 16 7 4	110 - 110 - 56 - 23 - 22 - 21 - 31 - 2	218 218 121 35 34 53 44	243 243 168 73 72 57 18 	596 481 316 124 121 109 52 4 100 15	320 278 192 95 91 66 19	346 342 225 84 83 80 32 5	188 188 122 40 38 46 16 4	187 137 85 31 31 31 21	302 302 217 114 114 62 20 3	450 545 382 182 177 113 47 3 105	219 219 144 56 53 41 29 5	238 238 139 49 48 61 37	
FAMILY TYPE BY PRESENCE OF OWN CHILDREN	1 044	1 200		747		=-4								
With own children under 18 years	695 1 167	1 300 888 1 596	1 959 1 225 2 251	747 320 564	2 433 1 201 2 141	760 413 729	1 118 625 1 226	761 450 970	409 330 658	723 385 773	1 644 881 1 678	777 441 919	1 728 986 1 810	
Manied-couple families With own children under 18 years Number of own children under 18 years	668 398 675	1 034 689 1 266	1 655 1 024 1 921	623 258 463	2 151 1 042 1 904	610 308 552	945 527 1 046	615 368 819	528 265 575	561 291 592	1 339 697 1 346	510 250 521	1 559 876 1 631	
Fessole householder, so bestend present With own children under 18 years Number of own children under 18 years	319 265 441	224 178 298	242 178 289	92 46 76	213 131 203	1 26 93 157	125 72 132	106 64 120	58 33 59	1 24 83 164	246 158 285	242 177 368	134 93 156	
MARITAL STATUS														
Male, 13 years and over	1 331 353 708 54 23 193	1 548 397 1 063 14 7 67	2 666 727 1 697 34 22 186	989 205 633 19 22 110	3 277 753 2 223 51 56 194	1 024 253 629 21 35 86	1 466 312 987 25 28 114	1 067 277 679 20 18 73	994 198 684 24 15 73	905 194 611 14 25 61	2 117 479 1 393 41 52 152	971 300 534 37 20 80	2 270 531 1 590 20 16 113	
Female, 15 years and over	1 593 263 708 85 197 340	1 750 322 1 055 40 93 240	2 648 465 1 692 59 119 313	1 073 146 637 22 127 141	3 486 614 2 211 57 340 264	1 102 175 630 32 148 117	1 565 217 990 42 168 148	1 027 162 653 29 96 87	855 131 553 19 64 88	1 044 129 585 41 155 134	2 391 316 1 391 - 72 365 247	1 188 290 532 74 114 178	2 289 389 1 587 21 126 166	

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Table P-1. General Characteristics of Persons: 1980—Con.

[for meaning of symbols, see introduction. For definitions of terms, see appendixes A and B]

4 ♥ 4 .	{				Tota	els for split to	acts in Dalles	County—Con			- ,- ,		
Census Tracts	Tract 0159	Tract 0163	Tract 0164	Tract 0165.02	Tract 0165.05	Tract 0165.07	Tract 0166.01	Tract 0166.03	Tract 0167.01	Tract 0167.02	Tract 0168	Tract 0169.03	Tract 0169.04
AGE		-											
Tetal persons Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 20 to 24 years 25 to 34 years 35 to 44 years 45 to 54 years 55 to 64 years 55 to 64 years 75 years and over	3 454 301 268 195 247 559 888 403 210 283 207 95	3 892 410 460 479 364 342 867 466 251 145 77 31	20 241 2 112 2 384 2 102 1 515 1 585 5 237 2 732 1 333 758 344 139	4 758 355 452 411 476 366 857 752 495 318 176 95	3 486 235 270 344 351 272 589 499 353 312 173 88	9 556 586 923 1 095 1 153 525 1 350 1 885 1 099 608 226 106	3 471 395 365 268 268 267 771 387 284 217 142 57	6. 640 479 602 619 608 415 1 165 1 074 749 468 305 156	7 004 616 751 1 003 1 095 618 951 922 655 305 120 48	# 485 787 783 738 775 1 472 948 912 671 399 207	7 165 458 503 530 637 501 1 024 952 792 797 553 428	3 173 391 313 255 279 285 516 295 302 274 160 103	20 40 38 34 32 45 44 34 26 21
3 and 4 years	107 2 858 2 781 2 552 442 393 27.1	178 2 462 2 304 2 113 161 134 23.7	874 13 275 12 619 11 878 779 649 26.0	146 3 446 3 243 2 972 418 367 28.9	95 2 576 2 450 2 214 386 327 29.9	247 6 714 6 171 5 674 563 442 29.7	149 2 371 2 265 2 097 297 260 26.6	192 4 821 4 550 4 249 659 569 30.5	253 4 499 4 031 3 433 287 231 20.4	306 6 003 5 680 5 215 907 776 27.5	182 5 558 5 272 4 939 1 355 1 187 34.2	147 2 151 2 043 1 884 381 333 25.9	5 276 256 239 63 57
Female Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 20 to 24 years 35 to 34 years 35 to 44 years 45 to 54 years 55 to 64 years 55 to 64 years 75 years and over	1 472 145 153 109 113 149 242 105 102 167 125 62	1 918 195 213 232 195 175 436 213 129 59 49	10 231 1 014 1 218 982 747 884 2 733 1 299 637 405 209 103	2 415 170 217 188 239 188 437 401 246 155 99 75	1 730 110 137 166 144 133 314 239 184 145 95 63	4 850 289 474 530 539 261 774 961 538 131 75	1 726 174 185 159 133 134 183 183 139 83 33	3 345 229 289 278 293 221 618 545 365 326 172 89	3 682 301 380 503 541 309 549 516 345 143 60 35	4 220 393 395 346 382 399 754 485 451 351 220 144	3 739 222 257 244 296 254 541 487 417 417 413 288	1 596 190 152 130 152 152 249 148 147 143 81 52	204 10 17 24 19 16 22 26 15 23 18
3 and 4 years 16 years and over 18 years and over 21 years and over 60 years and over 62 years and over	50 1 045 1 002 924 269 237 26.7	77 1 226 1 140 1 046 82 74 23.8	427 6 831 6 506 6 137 473 409 26.1	64 1 791 1 688 1 554 248 218 29.6	38 1 288 1 232 1 149 217 187 30.9	122 3 453 3 190 2 960 320 259 30.3	59 1 186 1 132 1 044 160 140 26.5	95 2 471 2 343 2 196 355 307 30.8	123 2 384 2 151 1 857 145 121 21.3	161 3 104 2 945 2 710 522 463 28.2	84 2 954 2 825 2 674 808 712 36.2	71 1 089 1 031 948 189 166 25.7	2 149 139 129 40 36 31.3
HOUSEHOLD TYPE AND RELATIONSHIP													
Total parsens In householder Householder Farrally householder Farrally householder Living done Spouse Other relatives Monrelatives Monrela	2 456 2 728 1 013 725 288 267 1 050 104 897 3 1 2 69 3 3 22	3 872 3 872 1 082 981 101 77 866 1 873 71 3.60 3.79	29 241 20 241 6 303 5 537 766 621 4 881 8 674 383 3.21 3.45	4 753 4 683 1 523 1 327 196 151 1 178 1 893 89 60 10 3.07 3.31	3 486 3 376 1 169 981 188 166 881 1 298 48 90 2.91 3.22	9 \$56 9 556 2 894 2 641 253 199 2 346 4 200 116 3.30 3.48	3 471 3 462 1 065 936 129 106 827 1 479 91 9	6 640 6 561 2 161 1 946 215 189 1 785 2 548 67 79 - 3.04 3.23	7 084 7 084 1 635 1 519 116 105 1 065 4 301 83 4.33 4.53	8 485 8 369 2 609 2 262 346 301 1 951 3 667 143 112 4 3.21 3.48	7 145 6 986 2 526 2 084 442 404 1 837 2 518 105 178 1	3 173 3 173 3 173 1 000 829 171 146 1713 1 395 65 	382 382 122 95 27 23 67 184 9
Persons 65 years and ever	302 302 217 114 114 62 20 3	108 108 62 20 19 31 13 2	483 483 303 142 137 89 82 9	271 216 131 49 44 45 37 3 55	261 261 176 74 73 61 23	332 332 172 58 53 80 77 3	199 197 118 50 47 45 32 2	461 390 241 67 64 101 46 2 71	148 168 91 20 20 29 48	606 528 328 127 123 101 93 6 77	981 818 547 212 206 197 66 8 163	263 178 66 64 61 22 2	47 47 32 16 15 5 10 -
FAMILY TYPE BY PRESENCE OF OWN CHILDREN	725	981	3 537	1 327	961	9 443	734	1 146	1 519	2 242	2 004	829	95
With own children under 18 years	385 773	673 1 460	3 784 7 154	787 1 423	532 958	2 641 1 744 3 256	559 1 101	1 129 1 983	1 070 2 560	1 296 2 526	i 010 i 763	436 976	43 86
Married-cauple families With own children under 18 years Number of own children under 18 years	561 291 592	966 593 1 300	4 881 3 304 6 325	1 178 686 1 254	881 481 882	2 346 1 521 2 891	827 493 968	1 785 1 030 1 832	1 065 761 1 848	1 951 1 127 2 251	1 837 867 1 550	71 3 376 843	67 34 66
Female basseholder, no healtond present	124 83 164	85 70 144	513 393 679	121 88 150	76 40 64	223 183 306	84 55 114	1 25 85 127	388 277 654	129 220	290 118 173	84 49 114	23 7 17
MARITAL STATUS													
Mole, 15 years end ever	384 1 255 42 26 120	1 273 277 893 27 13 63	6 626 1 229 4 969 71 40 317	363 1 206 24 19 83	1 329 336 902 8 20 54	3 395 857 2 391 23 23 101	1 215 238 867 30 17 63	2 411 451 1 817 21 39 83	2 216 907 1 118 72 33 86	2 991 697 2 045 61 54 134	2 658 558 1 895 22 58 125	1 090 213 744 33 35 65	131 34 69 8 10
Female, 15 years and over Single Now married, except separated Separated Wildowed Divorced	1 065 135 598 42 155 135	1 270 215 892 23 56 84	7 017 974 4 990 133 321 599	1 840 314 1 208 23 154 141	1 317 199 902 17 125 74	3 557 697 2 386 49 189 236	1 208 150 859 30 92 77	2 529 363 1 818 39 178 131	2 498 815 1 120 132 158 273	3 186 555 2 023 73 327 208	3 016 412 1 899 32 451 222	1 124 175 741 36 102 70	153 33 72 8 30 10

Table P-1. General Characteristics of Persons: 1980—Con.

[For meaning of symbols, see Introduction. For definitions of terms, see appendixes A and B]

		_			,	Arlington city,	Tarrant Cou	nty—Con.					
Census Tracts	Tract 1115.07*	Tract 1115.08	Tract 1115.09	Tract 1115.10*	Tract	Tract	Tract 1216.01	Tract 1216.04	Tract 1216.05	Tract 1216.06	Tract 1216.07	Tract 1217.01	Tract 1217.02
AGE					·					-			
Total persons Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 20 to 24 years 25 to 34 years 45 to 54 years 45 to 54 years 55 to 64 years 75 years and over	5 127 562 572 486 361 284 1 473 770 366 178 46 29	8 990 747 885 905 754 709 1 933 1 477 816 477 198 89	9 129 965 1 040 812 691 803 2 684 1 190 523 275 112 34	10 567 1 089 1 163 1 053 840 912 2 849 1 539 647 336 116 43	-	16 690 939 1 103 1 309 1 377 2 455 4 031 2 755 1 513 809 299 100	6 981 352 448 646 759 572 857 1 116 773 392 117 49	5 205 361 390 378 413 525 1 027 659 472 302 222 456	3 248 168 183 212 302 284 478 378 486 387 191 179	2 190 137 265 317 217 75 305 518 237 83 23	10 520 1 091 1 183 1 026 699 516 3 002 1 755 683 387 126 52	\$ 856 480 380 280 435 817 1 092 449 394 381 348 300	2 940 185 124 110 292 685 696 276 237 169 65
3 and 4 years 16 years and over 18 years and over 21 years and over 60 years and over 62 years and over	219 3 399 3 257 3 100 146 107 27.5	287 6 314 5 981 5 570 468 384 27.8	386 6 170 5 866 5 490 270 220 26.0	433 7 094 6 753 6 298 290 227 26.0	-	392 13 072 12 535 11 587 688 556 27.8	143 4 501 4 192 3 719 312 246 28.9	120 4 003 3 835 3 563 794 752 30.1	50 2 629 2 495 2 332 512 440 34.9	69 1 415 1 315 1 227 64 50 30.3	451 7 043 6 735 6 445 304 255 28.2	163 4 145 3 977 3 647 828 763 26.9	53 2 483 2 396 2 130 233 203 25.7
Female Under 5 years 5 to 9 years 18 to 14 years 15 to 19 years 20 to 24 years 25 to 34 years 35 to 44 years 45 to 54 years 55 to 64 years 55 to 64 years 75 years and over	2 567 284 286 259 169 151 768 352 161 89 27 21	4 533 365 453 451 376 367 1 052 698 377 235 101 58	4 563 476 517 399 329 429 1 400 543 245 146 58 21	5 163 534 518 513 377 487 1 454 733 288 168 62 29	-	8 246 443 569 643 757 1 237 1 981 1 287 709 383 170 67	3 001 155 213 296 371 273 455 592 371 169 71 35	2 749 156 178 195 207 262 541 328 241 146 138 357	1 661 71 90 108 143 131 238 215 241 190 114 120	1 127 80 132 158 107 34 181 272 272 111 30 13 9	\$ 144 499 563 476 326 311 1 585 791 301 193 65 34	2 825 233 169 136 222 2434 538 225 206 224 202 234	1 446 88 70 156 330 269 142 117 87 47 93
16 years and over 18 years and over 21 years and over 60 years and over 62 years and over	1 686 1 610 1 544 86 65 27.1	3 201 3 034 2 817 248 210 27.5	3 115 2 965 2 779 146 119 26.0	3 508 3 366 3 155 153 125 26.1	-	6 425 6 154 5 628 377 307 27.2	2 275 2 127 1 893 172 147 30.3	2 182 2 100 1 958 554 529 31.8	1 365 1 304 1 227 302 266 36.8	726 678 640 33 28 29.9	3 521 3 364 3 245 165 138 28.1	2 249 2 174 1 992 550 510 27.8	1 222 1 184 1 037 168 153 25.4
HOUSEHOLD TYPE AND RELATIONSHIP	4 197		9 129	10 667		14 400	4 441				10.000		
Total persess In householder Fornity householder Fornity householder Living done Spouse Other relatives Honrelatives Honrelatives Cotter, in group quarters Persons per household	5 127 5 127 5 127 1 553 1 436 117 83 1 371 2 120 83 	8 990 8 990 3 034 2 513 521 396 2 217 3 518 221 	9 095 2 948 2 457 491 350 2 156 3 708 283 - 34 3.09	10 587 10 587 3 268 2 899 369 243 2 580 4 465 274 		16 690 16 690 6 965 4 189 2 776 2 085 3 761 5 100 864	6 081 5 912 1 950 1 655 295 234 1 503 2 329 130 - 169 3.03	\$ 205 4 710 1 732 1 308 424 323 1 076 1 730 172 495 -	3 248 3 095 1 165 926 239 197 829 1 034 67 108 45	2 190 2 190 612 587 25 19 539 1 024 15	10 520 10 520 3 274 3 012 262 203 2 647 4 261 138	5 356 5 094 2 094 1 345 749 597 1 036 1 703 261 262 	2 940 2 840 1 371 707 664 516 557 692 220 92 8
Persons per family Persons 65 years and ever In householder Householder Living clone Spouse Other relatives Norrelatives Immate of institution Other, in group quarters	3.43 75 75 37 12 12 11 27	3.28 287 287 171 58 55 71 39 6	3.39 146 143 73 17 16 30 39	3.43 159 159 81 21 20 36 42		3.12 399 399 220 85 83 102 75 2	3.32 166 166 98 45 43 37 31	3.15 678 199 120 45 42 49 28 2 479	3.01 370 264 175 74 73 61 27 1 106	3.66 36 36 16 3 3 7 12	3.36 178 178 98 33 33 35 44	3.04 448 456 329 186 183 83 36 8	2.77 166 74 47 20 16 10 1
FAMILY TYPE BY PRESENCE OF OWN CHILDREN													1
Families With own children under 18 years Number of own children under 18 years	1 436 979 1 800	2 513 1 586 2 678	2 457 1 725 3 084	2 899 1 989 3 660	-	4 189 2 235 3 997	1 655 1 010 1 805	1 306 719 1 265	926 409 679	587 439 863	3 012 2 031 3 660	708 1 207	707 304 481
Martiel-couple families	1 371 930 1 701	2 217 1 352 2 503	2 156 1 489 2 708	2 580 1 744 3 244	=	3 761 1 994 3 642	1 503 902 1 636	7 076 560 1 026	829 358 596	539 395 776	2 847 1 899 3 433	1 036 505 901	557 230 368
Female bewebelder, no bushand present With own children under 18 years Number of own children under 18 years	45 39 83	238 196 320	238 193 309	250 207 356	-	301 195 290	1 23 91 140	188 137 227	79 46 77	42 38 79	125 104 185	252 182 278	106 61 94
MARITAL STATUS													;
Mala, 15 years and over	1 769 312 1 384 18 8 47	3 189 666 2 258 35 22 208	3 141 704 2 207 55 13 162	3 684 836 2 622 39 12 175	-	6 748 2 148 3 839 134 30 597	2 298 650 1 527 20 10 91	1 856 464 1 163 41 49 139	1 293 314 876 14 26 63	714 153 540 2 1 18	3 414 573 2 876 30 12 123	1 929 542 1 109 47 44 187	1 280 492 607 39 8 134
Female, 15 years and over Single Single Accept separated Separated Widowed Divorced	1 738 223 1 387 12 53 63	3 264 556 2 253 46 128 281	3 171 519 2 205 51 105 291	3 598 539 2 623 57 104 275	- - - - -	6 591 1 844 3 820 98 214 615	2 337 533 1 530 27 93 154	2 220 361 1 156 53 408 242	1 392 228 870 19 184 91	757 147 543 9 20 38	3 606 442 2 682 30 89 163	2 287 447 1 101 73 359 307	1 241 323 573 43 129 173

Table P-1. General Characteristics of Persons: 1980—Con.

[For meaning of symbols, see introduction. For definitions of terms, see appendixes A and B]

	Arlington city, Tarrant County—Con.												
Consus Tracts	Tract 1218	Tract 1219.01	Fract 1219.02*	Tract 1220	Tract 1221	Tract	Tract 1223	Tract 1224	Tract 1225*	Tract	Tract 1227	Tract 1228	Tract 1229
AGE		•											
Total persons Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 25 to 34 years 25 to 34 years 35 to 44 years 55 to 64 years 55 to 64 years 75 years 75 years and over	285 9 3 19 32 61 34 18 11 26 71	3 874 235 216 183 404 855 885 406 355 212 81 42	5 480 493 414 350 1 116 1 329 563 397 224 76 28	6 906 521 481 509 704 951 1 298 754 806 580 212 90	5 600 439 433 365 419 683 1 100 515 626 580 314 126	1 773 87 76 70 148 399 387 126 112 165 133 70	3 486 108 39 34 1 351 805 128 77 124 69 78	5 622 365 245 242 621 1 374 1 197 347 404 391 301 135	3 509 174 205 279 305 304 549 437 498 474 193 91	3 979 186 304 380 478 334 497 653 580 374 113 80	4 055 271 253 237 307 535 780 379 368 503 278 144	6 276 445 319 346 703 1 405 1 167 574 579 455 189 94	6 184 530 523 512 603 771 1 163 723 688 467 148 56
3 and 4 years	4 271 264 245 101 100 41.2	90 3 193 3 084 2 657 197 162 25.3	169 4 150 3 997 3 561 179 140	213 5 287 5 005 4 510 535 426 26.5	157 4 282 4 114 3 847 687 566 28.2	31 1 516 1 490 1 331 275 245 26.8	34 3 292 3 241 2 278 217 188 22.8	135 4 730 4 594 3 816 609 544 24.8	70 2 779 2 664 2 668 471 371 33.8	74 3 006 2 803 2 549 318 263 31.7	90 3 249 3 155 2 899 647 542 29.6	150 5 075 4 881 4 167 457 369 24.7	199 4 503 4 238 3 871 373 295 25.8
Female Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 20 to 24 years 25 to 34 years 25 to 34 years 35 to 44 years 35 to 64 years 55 to 64 years 55 to 64 years 55 to 64 years 57 years 57 years and over 57 years and over 57 years and over 58 to 57 years and over 58 to 57 years and over 58 to 58 to 58 years 57 years and over 58 to	147 5 2 1 8 11 20 8 8 6 19 59	1 955 112 98 88 225 437 405 209 188 109 54 30	2 743 226 197 190 277 562 617 296 191 120 48 19	236 241 246 352 457 614 368 428 272 125 70	2 805 190 208 183 214 351 508 259 352 280 181 79	840 42 42 37 79 182 157 48 48 93 81	1 752 48 16 18 490 687 234 52 34 72 42 59	2 563 199 129 126 240 523 470 171 230 206 172 97	1 850 86 102 139 164 153 293 245 265 241 101 61	1 991 78 162 173 240 134 262 357 282 182 69 52	2 122 136 131 125 161 264 371 194 221 266 154 99	3 012 226 162 152 363 628 497 288 311 227 96 62	3 106 259 259 262 297 379 564 382 361 228 77 38
3 and 4 years	3 139 136 129 81 80 67.5	39 1 633 1 571 1 335 124 103 25.2	74 2 098 2 014 1 765 111 87 24.2	92 2 632 2 487 2 246 308 258 26.8	57 2 177 2 099 1 959 378 312 29.0	12 726 712 633 174 158 26.9	18 1 663 1 634 950 141 127 21.4	84 2 091 2 021 1 759 363 329 25.7	34 1 489 1 421 1 374 260 210 34.6	33 1 530 1 430 1 313 176 153 33.3	52 1 712 1 669 1 525 371 324 30.7	76 2 426 2 327 1 962 245 198 24.7	95 2 272 2 134 1 963 200 165 26.2
HOUSEHOLD TYPE AND RELATIONSHIP	285		5 480								4 055	6 276	6 184
Tetal perseas In households Householder Family householder Living alone Spouse Other relatives Nonrelatives Nonrelatives Nonrelatives Persons per household	189 117 45 72 63 33 26 13 88 8	3 874 3 874 1 796 1 005 791 602 768 1 042 268 2.16 2.80	5 480 2 339 1 417 922 716 1 084 1 742 315 	6 906 6 906 2 547 1 863 684 525 1 585 2 488 286 	5 600 5 600 2 073 1 661 412 328 1 445 1 914 168 	1 773 918 403 515 417 300 398 157 - 1.93 2.73	3 486 2 848 1 596 498 1 098 681 380 319 553 11 627 1.78 2.40	5 622 5 159 2 300 1 295 1 005 703 1 033 1 355 471 7 456 2 24 2 84	3 909 3 509 1 353 1 075 278 239 900 1 186 70 	3 979 3 979 1 310 1 125 185 137 1 004 1 577 88 	1 707 1 193 514 428 1 018 1 195 135 	6 276 2 697 1 586 1 111 801 1 301 1 832 446 	6 184 2 106 1 733 375 263 1 415 2 443 218
Persons per family Persons 65 years and over In households Householder Living done Spouse Other relatives Innate of institution Other, in group quarters	97 9 7 4 4 1 1 - 86 2	123 123 79 44 44 24 20	104 104 68 34 33 18 18	302 302 187 92 89 69 42 4	440 440 287 113 111 117 35 1	203 203 159 94 90 33 8	147 146 113 76 69 26 5 2	436 434 311 144 139 90 32 1	284 284 191 76 75 56 36 1	193 193 114 43 42 45 34	422 422 278 117 116 108 35	283 283 191 73 68 63 26 3	204 204 128 42 41 43 32
FAMILY TYPE BY PRESENCE OF OWN CHILDREN	45	1 005	1 417	1 863	1 661	403	498	1 295	1 075	1 125	1 193	1 586	1 733
With own children under 18 years	10 15	469 700	82] 1 371	939 1 746	751 1 367	133 240	139 183	554 916	470 798	612 1 126	514 859	759 1 284	981 1 771
Married-cauple familles With own children under 18 years Number of own children under 18 years	7 9	7 68 323 491	1 084 578 988	761 1 435	1 445 628 1 165	300 82 151	380 95 126	1 033 419 705	9 00 365 636	1 004 540 1 014	1 018 414 701	1 301 589 1 011	1 415 756 1 381
Female bouseholder, so hechand present	7 2 3	181 125 179	259 215 342	202 147 267	163 106 173	70 37 68	63 36 48	191 121 190	140 90 142	99 59 96	151 94 152	205 137 228	256 189 334
MARITAL STATUS				•		•							
Male, 15 years and over	133 35 56 12 6 24	1 583 564 790 44 13 172	2 698 641 1 129 72 . 15 236	2 709 783 1 647 46 22 211	2 139 484 1 471 39 18 127	801 321 334 27 13 106	1 635 1 071 435 25 10 94	2 661 1 343 1 093 43 22 160	1 328 307 916 9 17 79	1 531 436 1 017 10 15 53	1 564 390 1 038 21 28 87	2 694 1 084 1 342 52 24 192	2 293 616 1 445 39 21 172
Femole, 15 years and over Single Now married, except separated Separated Widowed Divorced	139 9 48 5 68 9	1 657 499 782 44 91 241	2 130 486 1 104 94 92 354	2 686 535 1 621 70 170 290	2 224 314 1 472 38 209 191	739 206 309 25 101 98	7 670 1- 071 404 22 80 93	2 109 593 1 063 47 208 198	1 523 276 921 16 130 180	1 578 341 1 020 20 104 93	1 730 297 1 040 13 182 198	2 472 685 1 335 66 145 241	2 326 410 1 444 70 133 269

Table P-1. General Characteristics of Persons: 1980—Con.

[for meaning of symbols, see introduction. For definitions of terms, see appendixes A and B] ${}^{\circ}$

Consum Toronto			·		Totals for	split tracts in	Tarrant County	—Con.				
Census Tracts	Tract 1109.02	Tract -1110.01	Tract 1110.04	Tract 1111.01	Tract VIII.02	Tract 1112.01	Tract 1113.01	Tract 1113.02	Troct 1114	Tract 1115.03	Tract 1115.04	Tract 1115.05
AGE												
Total persons Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 20 to 24 years 25 to 34 years 35 to 44 years 45 to 54 years 55 to 64 years 75 years and over	9 725 772 834 825 826 589 2 035 1 425 1 174 733 324 188	55 57 88 75 46 103 125 109 139 171 253	7 488 600 764 809 738 585 1 501 1 161 573 355 218 184	6 790 538 618 590 671 523 1 121 834 761 589 331	5 160 514 607 583 455 367 1 141 681 416 224 125 47	3 320 192 235 276 336 188 448 523 493 362 194 73	3 510 240 292 318 383 254 464 537 459 308 187 68	7 841 637 749 776 758 616 1 377 1 079 733 472 363 281	6 693 455 484 582 691 592 954 922 829 589 381 212	1 149 80 68 108 127 68 162 180 150 150 63 35	\$ 812 1 020 913 784 532 572 2 536 1 322 615 311 148 59	4 996 256 377 536 555 555 670 873 682 169 79
3 and 4 years	306 7 107 6 753 6 356 817 692 30.1	19 1 002 966 936 492 464 50.7	240 5 160 4 801 4 470 546 472 26.8	231 4 911 4 635 4 245 789 672 28.9	213 3 349 3 152 2 939 267 222 25.6	72 2 542 2 403 2 239 434 370 34.7	99 2 568 2 409 2 219 382 333 31.2	239 5 512 5 171 4 805 846 753 28.1	176 5 028 4 748 4 347 830 719 30.6	25 868 810 752 147 127	406 5 983 5 743 5 476 325 278 27.8	103 3 710 3 456 3 186 435 340 32.1
Female Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 20 to 24 years 25 to 34 years 35 to 44 years 45 to 54 years 55 to 64 years 65 to 74 years 75 years and over	4 868 385 407 395 389 313 1 031 732 556 355 165 140	677 28 30 33 28 27 56 62 52 73 114 174	3 839 290 391 412 362 311 811 551 283 172 120 135	3 474 273 299 296 331 268 569 436 382 296 174 150	2 595 266 291 284 207 206 597 342 194 113 66 29	1 688 101 114 141 169 96 241 267 250 162 103 44	1 724 108 139 170 160 131 241 266 216 148 101	3 953 297 365 404 359 310 712 523 353 225 216 189	3 302 207 237 281 335 295 490 465 389 281 194 128	543 37 28 48 61 34 86 96 71 50 28 24	4 343 477 458 395 263 319 1 304 562 302 148 81 34	2 556 119 174 261 265 183 368 469 343 209 106 58
3 and 4 years	155 3 592 3 423 3 234 448 387 30.1	8 581 565 554 325 313 58.5	116 2 664 2 488 2 329 326 296 27.0	110 2 541 2 406 2 214 447 389 29.6	111 1 703 1 617 1 519 138 119	32 1 278 1 222 1 141 229 196 34.4	47 1 265 1 196 1 118 206 178 31.7	118 2 811 2 666 2 477 516 460 28.9	75 2 513 2 375 2 174 436 385 31.2	12 437 410 383 73 64 33.1	202 2 981 2 855 2 726 179 154 27.4	54 1 942 1 819 1 691 242 198
HOUSEHOLD TYPE AND RELATIONSHIP												
Total persons	9 725 9 589 3 157 2 826 331 264 2 583 3 700 149 132	1 221 1 153 516 331 185 178 303 322 12 68	7 488 7 371 2 345 2 067 278 253 1 811 3 137 78 117	6 790 6 671 2 100 1 830 270 225 1 586 2 846 139 119	5 160 5 160 1 504 1 346 158 135 1 159 2 417 80	3 326 3 319 1 131 1 016 115 106 958 1 204 26	3 510 3 510 1 136 990 146 131 900 1 431 43	7 841 7 722 2 466 2 123 343 301 1 910 3 235 111 119	6 691 6 634 2 338 1 899 439 390 1 678 2 472 146 57	1 149 1 149 387 322 65 54 291 447 24	8 812 8 800 2 833 2 563 270 223 2 413 3 451 103 	4 996 4 996 1 732 1 410 322 281 1 225 1 954 85
Persons per household	3.04 3.22	2.23 2.89	3.14 3.39	3.18 3.42	3.43 3.66	2.93 3.13	3.09 3.35	3.13 3.42	2.84 3.19	2.97 3.29	3.11 3.29	2.88 3.25
Persess &S years and over In households	512 393 216 65 59 97 75 5 118	424 359 260 153 150 80 16 3 65	402 294 174 54 53 78 37 5	545 430 277 88 82 102 45 6	172 172 96 23 23 44 31 1	267 267 154 44 44 78 34 1	255 255 150 47 46 67 38	544 539 348 146 143 130 57 4 105	593 541 362 143 141 136 39 4 52	98 98 69 27 26 22 6	207 207 118 37 36 53 36 	248 248 163 92 91 48 37
FAMILY TYPE BY PRESENCE OF OWN CHILDREN							•					
With own children under 18 years Number of own children under 18 years	2 826 1 606 2 813	331 123 232	2 067 1 379 2 534	1 830 1 007 1 925	1 346 916 1 840	1 016 488 862	990 549 985	2 123 1 249 2 441	1 899 975 1 711	322 170 311	2 563 1 616 2 939	1 410 837 1 486
Married-crepte families With own children under 18 years Number of own children under 18 years	2 583 1 450 2 579	303 116 222	1 811 1 193 2 243	1 586 856 1 655	1 159 787 1 601	958 458 811	900 503 914	1 910 1 140 2 255	1 678 865 1 540	291 151 278	2 413 1 506 2 761	1 225 693 1 270
Female herseholder, as hisband present With own children under 18 years Number of own children under 18 years	177 124 192	22 6 9	203 159 25 0	184 118 220	146 103 185	44 22 40	68 35 55	1 61 87 149	153 84 137	26 14 21	107 79 135	153 128 191
MARITAL STATUS												1
Male, 15 years and ever	3 613 723 2 678 42 48 122	435 78 309 2 30 16	2 569 544 1 848 34 28 115	2 438 580 1 644 39 43 132	1 702 388 1 192 22 19 81	1 285 238 970 13 16 48	1 353 309 926 23 16 79	2 792 608 1 979 29 56 120	2 593 572 1 743 50 61 167	443 96 302 6 9 30	3 062 454 2 445 30 18 115	1 825 466 1 245 10 20 84
Fearale, 15 years and ever	3 681 516 2 658 50 260 197	586 98 310 9 152 17	2 746 427 1 846 34 219 220	2 606 463 1 641 50 271 181	1 754 286 1 202 37 86 143	1 332 208 975 12 81 56	1 307 186 926 21 104 70	2 887 430 1 969 35 298 155	2 577 369 1 728 41 237 202	450 87 298 11 36 18	3 033 332 2 443 32 101 125	2 002 412 1 237 29 148 176

Table P-1. General Characteristics of Persons: 1980—Con.

{For meaning of symbols, see Introduction. For definitions of terms, see appendixes A and B}

_	Totals for split tracts in Tarrant County—Con.											
Census Tracts	Tract 1115.06	Tract 1115.07	Tract 1115.10	Tract 1130	Tract 1131	Tract 1132.05	Tract 1132.06	Tract 1133.01	Tract 1133.02	Tract 1134.03	Tract .1134.06	Tract 1135.05
AGE											-	
Tetal persons Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 25 to 19 years 25 to 34 years 35 to 44 years 35 to 44 years 55 to 64 years 55 to 64 years 75 years and over	4 789 271 347 414 456 471 789 731 667 413 157 73	6 088 620 638 587 472 341 1 586 946 491 265 88 54	10 587 1 089 1 163 1 053 840 912 2 849 1 539 647 336 116 43	5 510 482 441 506 592 481 971 864 570 382 130 91	16 792 949 1 115 1 316 1 382 2 472 4 047 2 771 1 516 820 303 101	6 \$60 313 465 568 591 380 869 914 1 040 850 348 222	4 441 282 330 405 427 397 770 557 533 368 265	4 251 190 234 288 385 274 448 509 620 729 431 143	4 190 287 309 303 351 454 725 483 422 432 219 205	3 539 159 257 393 410 244 424 603 531 346 119 53	9 801 . 758 669 710 919 1 287 1 715 1 195 1 162 816 389 181	4 068 229 307 415 464 336 608 730 545 250 112 92
3 and 4 years 16 years and over 18 years and over 21 years and over 60 years and over 62 years and over	124 3 679 3 475 3 198 384 305 30.4	244 4 113 3 922 3 712 245 195 28.0	433 7 094 6 753 6 298 290 227	195 3 960 3 721 3 377 376 302 27.6	395 13 144 12 605 11 650 698 566 27.8	147 5 098 4 823 4 532 934 770 35.9	106 3 346 3 173 2 908 535 455 29.8	93 3 451 3 289 3 097 918 768 41.1	115 3 229 3 086 2 848 623 539 29.7	75 2 646 2 471 2 270 285 224 32.5	274 7 525 7 172 6 500 888 747 27.9	93 3 034 2 846 2 610 295 258 29.9
Female Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 20 to 24 years 25 to 34 years 35 to 44 years 45 to 54 years 55 to 64 years 55 to 64 years 75 years and over	2 481 137 175 221 219 254 409 401 325 193 96 51	3 657 314 310 307 230 179 833 442 224 133 48	5 163 534 518 513 377 487 1 454 733 288 168 62 29	2 729 238 201 251 310 224 515 416 264 180 70 60	8 295 448 576 645 758 1 246 1 987 1 298 709 389 171 68	3 391 159 227 291 297 166 479 472 532 417 188 163	2 293 128 169 208 214 196 390 292 272 200 150 74	2 208 89 122 147 190 132 236 271 316 374 238 93	2 227 149 153 164 195 232 356 255 227 220 117 159	1 803 86 123 192 207 125 209 336 263 160 70 32	4 978 361 327 341 483 643 851 630 595 407 221	2 078 117 144 212 224 165 322 375 261 117 69 72
3 and 4 years 16 years and over 18 years and over 21 years and over 60 years and over 62 years and over	66 1 919 1 818 1 673 214 173 30.8	122 2 058 1 958 1 866 140 113 27.6	209 3 508 3 366 3 155 153 125 26.1	90 1 967 1 857 1 682 197 162 27.9	174 6 460 6 188 5 659 381 311 27.2	69 2 658 2 517 2 383 506 440 36.5	51 1 745 1 660 1 538 314 269	44 1 802 1 726 1 632 497 423	53 1 728 1 651 1 520 369 330 30.8	39 1 358 1 272 1 167 154 124 33.2	127 3 879 3 703 3 341 517 442 28.6	49 1 555 1 462 1 354 176 163 31.0
HOUSEHOLD TYPE AND RELATIONSHIP Total persens In households Householder Family householder Nonfamily householder Living dione Spouse Other relatives Inmate of institution	4 789 4 789 1 807 1 328 479 384 1 155 1 692 135	6 088 6 088 1 866 1 711 155 116 7 623 2 504 95	10 587 10 587 3 268 2 899 369 243 2 580 4 465 274	5 510 5 437 1 849 1 401 448 370 1 141 2 287 160 73	16 792 16 792 7 000 4 217 2 783 2 091 3 784 5 139 869	6 540 6 432 2 218 1 936 282 236 1 753 2 363 98 128	4 441 4 441 1 631 1 284 347 296 1 102 1 613 95	4 251 4 251 1 576 1 347 229 204 1 207 1 423 45	4 190 4 019 1 505 1 177 328 282 983 1 429 102 171	3 539 3 539 1 178 1 022 156 133 904 1 406 51	9 801 9 783 3 757 2 822 935 752 2 343 3 361 322	4 068 3 995 1 339 1 101 238 187 968 1 607 81
Other, in group quarters Persons per household Persons per family	2.65 3.14	3.26 3.41	3.24 3.43	2.94 3.45	2.40 3.12	2.90 3.13	2.72 3.11	2.70 2.95	2.67 3.05	3.00 3.26	7 2.60 3.02	2.98 3.34
Persons 65 years and over In households Householder Nonfamily householder Living alone Spouse Other relatives Nomelatives Inmate of institution Other, in group quarters	230 230 136 53 53 55 37 2	142 142 80 24 23 32 29	159 159 81 21 20 36 42 -	221 161 86 25 23 34 38 3	464 404 224 86 84 102 75 3	\$70 466 272 84 82 122 69 3 104	372 372 239 103 100 93 37 3	574 574 337 93 86 178 56 3	424 268 171 69 66 67 26 4 156	172 172 98 36 36 41 32	570 570 380 173 165 133 50 7	204 123 68 22 21 32 23 81
FAMILY TYPE BY PRESENCE OF OWN CHILDREN	1 328	1 711	2 899	1 401	4 217	1 936	1 284	1 347	1 177	1 022	2 822	1 101
With own children under 18 years Number of own children under 18 years	70 i 1 250	1 134 2 077	1 989 3 660	810 1 568	2 250 4 021	910 1 627	669 1 178	496 885	574 1 001	554 1 015	1 458 2 403	1 154
Married-couple femilies With own children under 18 years Number of own children under 18 years	1 155 585 1 066	1 623 1 075 1 963	2 580 1 744 3 244	7 747 654 1 285	3 784 2 006 3 663	904 1 456	1 102 552 1 002	1 207 442 799	983 450 808	904 475 892	2 343 1 145 1 946	968 584 1 018
Female bouseholder, no husband present	149 105 164	65 47 95	250 207 356	206 140 259	303 196 291	146 87 146	146 99 150	118 42 70	162 102 155	95 69 111	382 255 371	104 72 121
MARITAL STATUS				Y							4 ===	,
Male, 15 years and over	1 809 473 1 167 27 13 129	2 117 391 1 640 20 11 55	3 684 836 2 622 39 12 175	2 042 564 1 190 72 38 178	6 786 2 157 3 862 134 32 601	2 500 519 1 795 29 38 119	1 636 358 1 118 23 29 108	1 689 343 1 235 24 22 65	1 530 322 1 028 31 29 120	· 1 328 326 923 7 13 59	3 715 898 2 394 60 36 307	1 532 400 991 18 21 102
Female, 15 years and over	. 1 948 396 1 169 37 121 225	2 126 299 1 645 15 84 83	3 598 539 2 623 57 104 275	2 039 424 1 171 99 131 214	6 626 1 847 3 843 98 219 619	2 714 442 1 784 40 278 170	1 788 288 1 118 28 176 178	1 850 264 1 240 20 217 109	1 761 266 1 022 34 239 200	1 402 277 922 16 85 102	3 949 682 2 399 85 274 509	1 605 308 987 36 139 135

Table P-1. General Characteristics of Persons: 1980—Con.

[For meaning of symbols, see Introduction. For definitions of terms, see appendixes A and B]

	Totals fo	r split trocts in To	arrant County—Co	on.	Wist			County				
Census Tracts	Troct 1142.02	Tract 1219.02	Tract 1225	Tract 1226	Tract 1501	Tract 1502	Tract 1503	Tract 1504	Fract 1505	Troct 1506		
AGE												
Total parsons Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 20 to 24 years 25 to 34 years 35 to 44 years 45 to 54 years 45 to 54 years 55 to 64 years 75 years ond over	3 195 216 247 293 304 218 415 508 417 327 169 81	5 529 494 415 351 494 1 126 1 342 573 405 225 76 28	3 509 174 205 279 305 304 549 437 498 474 193 91	3 979 186 304 380 478 334 497 653 580 374 113 80	3 465 227 285 305 381 208 449 471 403 326 252 158	4 104 316 336 280 293 312 576 404 337 366 417 467	1 405 101 118 118 132 84 182 149 136 158 116	6 961 467 535 620 635 465 922 931 795 713 558 320	3 737 329 294 279 330 384 560 332 346 354 290 239	\$ 903 422 570 672 642 433 955 960 816 665 497 271		
3 and 4 years 16 years and over 18 years and over 21 years and over 60 years and over 62 years and over	96 2 380 2 244 2 098 378 330 32.8	170 4 196 4 041 3 602 179 140 24.5	70 2 779 2 664 2 468 471 371 33.8	74 3 006 2 803 2 549 318 263	90 2 572 2 401 2 230 562 505 32.2	116 3 112 2 993 - 2 806 1 069 992 33.7	49 1 043 985 915 306 278 33.4	195 5 206 4 939 4 600 1 243 1 108 33.4	113 2 782 2 652 2 426 712 636 29.5	171 5 102 4 832 4 485 1 077 935		
Female Under 5 years 5 to 9 years 10 to 14 years 15 to 19 years 25 to 34 years 35 to 34 years 45 to 54 years 45 to 54 years 55 to 64 years 75 years and over	1 584 101 116 136 163 100 211 267 196 159 83	2 756 226 198 191 280 564 619 298 193 120 48	1 850 86 102 139 164 153 293 245 265 241 101 61	1 991 78 162 173 240 134 262 357 282 182 69 52	1 706 115 130 142 187 92 227 240 191 166 132 84	2 204 145 175 134 145 160 279 202 180 210 239 335	786 55 62 48 59 • 44 86 78 67 83 63	3 472 209 276 321 316 233 475 457 382 342 284 177	1 912 158 146 138 152 193 261 178 169 200 162 155	3 434 206 286 333 293 299 504 467 397 313 273 151		
3 and 4 years 16 years and over 18 years and over 21 years and over 60 years and over 62 years and over	52 1 204 1 125 1 052 1 98 1 73 33.3	74 2 109 2 023 1 773 111 87 24.2	34 1 489 1 421 1 314 260 210 34.6	33 1 530 1 430 1 313 176 153 33.3	40 1 280 1 196 1 116 298 265 33.3	57 1 728 1 671 1 560 678 638 37.4	26 529 505 473 162 149 34.9	86 2 594 2 465 2 297 641 563 33.4	60 1 442 1 377 1 282 423 384 31.5	80 2 541 2 414 2 266 586 503 32.7		
HOUSEHOLD TYPE AND RELATIONSHIP												
Total persons In households Householder Family householder Nonfamily householder Living clone Spouse Other relatives Nonrelatives Inmate of institution Other, in group quarters	3 195 3 135 1 076 915 161 139 816 1 192 51 60	\$ \$29 5 529 2 375 1 424 951 744 1 090 1 745 319	3 509 3 509 1 353 1 075 278 239 900 1 186 70	3 979 3 979 1 310 1 125 185 137 1 004 1 577 88	3 465 3 465 1 158 998 160 152 920 1 356 31	4 104 3 944 1 549 1 103 446 424 942 1 375 78 159	1 405 1 405 511 394 117 111 354 532 8	6 961 6 961 2 502 2 077 425 404 1 925 2 463 71	3 737 3 645 1 327 1 027 300 273 909 1 315 94 90	6 903 6 900 2 364 1 978 386 360 1 823 2 621 92 -		
Persons per household Persons per family	2.91 3.19	2.33 2.99	2.59 2.94	3.04 3.29	2.99 3.28	2.55 3.10	2.75 3.25	2.78 3.11	2.75 3.17	2 92 3.25		
Persons 65 years and over In households	250 200 127 37 34 55 16 2 50	104 104 68 34 33 18 18	284 284 191 76 75 56 36 1	193 193 114 43 42 45 34 	410 410 257 86 85 116 36	733 524 257 257 173 35 1	227 227 160 75 75 57 10 - -	878 878 582 227 226 243 50 3	529 444 311 145 142 103 28 2	768 767 503 206 201 198 59 7		
FAMILY TYPE BY PRESENCE OF OWN CHILDREN												
With own children under 18 years	915 476 875	1 424 824 1 374	1 075 470 798	1 125 612 1 126	998 495 987	1 103 495 980	394 · 190 391	2 077 989 1 851	1 027 524 993	1 978 983 1 882		
Married-couple families With own children under 18 years Number of own children under 18 years	816 412 770	1 090 580 990	900 365 636	1 004 540 1 014	920 461 941	942 416 834	354 172 365	1 925 911 1 709	909 461 901	1 623 910 1 751		
Female hosseholder, no husband present With own children under 18 years Number of own children under 18 years	68 45 76	250 216 343	140 90 142	99 59 96	39 19 26	127 63 125	28 12 18	98 50 100	94 52 73	110 55 98		
MARITAL STATUS												
Male, 15 years and over	1 208 238 837 22 30 81	2 128 655 1 136 74 17 246	1 328 307 916 9 17 79	1 531 436 1 017 10 15 53	1 329 281 949 9 44 46	1 422 281 1 000 24 48 69	\$27 116 365 5 18 23	2 673 485 1 969 17 71 131	1 365 278 962 10 37 78	2 632 543 1 882 34 46 127		
Female, 15 years and ever	1 231 183 832 21 104 91	2 141 488 1 110 94 92 357	1 523 276 921 16 130 180	1 578 341 1 020 20 104 93	1 319 200 945 14 117 43	1 750 217 978 33 425 97	541 70 363 5 77 26	2 666 319 1 956 27 270 94	1 470 165 939 24 247 95	2 607 336 1 843 26 275 107		

Air and On-site Population Targets

	Est	Worksheet		
Distance From	Census	Percentage Of Tract	Population	Total
Site (Miles)	Tract #	Between Site Distances	Between Site Distances	Population
0 > 14	121,02	- 5	U	
	1218	10	29	
	1220	10	691	
	1221	10	560	1,280
14 > 1/2	1217,02	10	294	
	1218	10	. 29	
	1220	20	1,381	
	1221	15	840	2,544
0 -> 1/2				3,824
1/2 > 1	1217.02	60	1, 764	
	1218	20	57	
	1219.02	10	553	
	1220	70	4,834	
<u> </u>	1221	60	3,360	10,568
	- All		10	
	1223		So	
0 > 1				14,392
1-2	1130	20	1,102	
	_113/	10	1,679	
	1217.01	75	4,017	
	1217.02	30	882	
	1218	50	142	
	1219,01	100	3,874	
				2

	Air	and On-site Pop	ulation Targets	
	(Est)	Worksheet		
Distance From	Census	Percentage Of Tract	Population	Total
Site (Miles)	Tract #	Between Site Distances	Between Site Distances	Population
1-2 (con't)	1219.02	70	3,870	
	1220			
	1221	15	840	
and the second second	1222	70	1,241	
	_ /223	65	2,266	
	1224	30	1,687	
	1228	35	2,197	
	1229	95	5,875	29,672
$0 \rightarrow 2$,	44,064
2 > 3	154	20	1,726	
	161	55	1,652	
	1115.03	5	57	
	1115.09	20	1,826	
	1115,10	50	5,294	
•	1130	40	2,204	
	1131	25	4,198	
	1216,05	2 <i>5</i> 9 <i>5</i>	3,086	
	1217.01	25	1,339	
,	1218	10	28	
	1219.02	20	1,106	
	1222	30	532	
	1223	35	1,220	
	1224	70	3,935	
	1227	75	3,041	
	1228	65	4,079	2

r,

	Air	and On-site Pop	ulation Targets	
	Est	Worksheet		
Distance From			Population	Total
Site (Miles)	Tract #	Between Site Distances	Between Site Distances	Population
2-3 (con't)	1729	5	309	35,632
0 > 3				79,696
3 → 4	154	75	6,473	
·	155	60	1,669	
	160	65	3,940	
	161	45	1,352	
	162	35	2,146	
	164	5	1,012	
	1115,03	5	57	
	1115.06	5	239	
	1115.08	35	3,147	
	1115.09	60	5,477	
	1115.10	50	5,293	
	1130	20	1,102	
•	1/3/	. 35	5,877	
	1216.01	25	1,520	
	1216.04	95	4,945	
	1216.05	5	162	
	1225	100	3,509	
	1226	80	3,183	
	1227	25		52,117
0->4			,	31,813

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone CallDiscussionField ConferenceOther(Specify)	d Trip
TO: Rene Del Rosa	From:	Date:
Secretary, Flood Plain Management Office U.S. Army Corp of Engineers	RW Raymond Wayne, FIT Hydrologist	5/23/89
Ft. Worth, Texas (817) 334-3207		10:50 AM
SUBJECT: G.M. ASSEMBLY	- PA (TXD008018004)	
SUMMARY OF COMMUNICATION	V	
The entire G. M. Assembl	ly facility is outside the 500-year	floodplain
(classification is Zone	X).	
Floodplain reference is	from Panel 485454-0009C and is dated	i February 4,
1988.		
		·
<u> </u>		
CONCLUSIONS, ACTION TAKE	N OR REQUIRED	
		•
INFORMATION COPIES TO:		

EPA FORM 1300-6 (7-72) Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Interim Remedial Action Plan

Arlington, Texas Plant

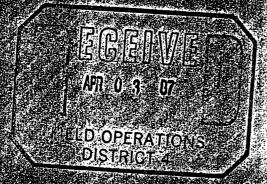
General Motors Corporation C•P•C Division







March 1987





HDR Infrestructure
A Centerra Company

GM ARLINGTON PAINT MIX INTERIM REMEDIAL ACTION PLAN

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phase concerned with remediation of all remaining VOC contamination. This two phase approach was developed to allow for immediate removal of the perched layer contaminants which pose a threat of spreading contamination by water movement and dilution. Until the perched water layer VOC's are removed, final soil VOC levels cannot be determined and therefore, a soil remediation program cannot be developed. Once the first phase is completed, a second phase remedial action plan will be submitted to the Texas Water Commission (TWC) for review.

The proposed first phase remedial action plan includes the following features:

- Continuous removal of perched groundwater through a french drain system installed along the West Paint Mix Loading Dock.
- Removal of water VOC's by an air stripping system to levels below proposed RMCL's (1986 SDWA Amendments).
- Disposal of the treated water to General Motor's industrial wastewater pretreatment plant.
- Monitoring of air stripping system performance and collected water VOC levels by analytical testing methods.
- Continuous operation of the air stripper until perched ground water VOC levels are below proposed RMCL's for at least one continuous month.
- Continuous groundwater removal and disposal until completion of second phase remedial plan.
- Migration pathway evaluation studies and investigations will be conducted.
- Monthly status reports to TWC.
- Additional soil sampling for VOC's, after water VOC's have been removed, to provide a complete picture of soil contamination.
- Submission of second phase remedial plan addressing soil remediation with 60 days of completion of the Phase I Plan.

GM proposes to implement the perched water VOC treatment system within 30 days of receipt of approval from the Texas Water Commission.

II. INTRODUCTION

A. Background

General Motors Chevrolet-Pontiac-Canada (C-P-C) Division operates an automobile assembly plant in Arlington, Texas. The plant is located at the northwest intersection of State Highway 360 and Abrams Road (Refer to Figure II A.1). GM has operated at this site for approximately 40 years.

Major manufacturing operations at the plant include the assembly of prefabricated components and painting of metallic body components. Painting is accomplished through a number of steps including metal preparation, priming, and multi-layer color coating. To support the painting operation, GM utilizes a Paint Mix Building to store bulk paints and paint thinners. The Paint Mix Building is located adjacent to the west side of the main assembly building (Figure II-A-1). Deliveries of new paints are made at a loading dock located on the south side of the building.

Due to the construction of a new thermal oxidizer for volatile organic compound (VOC) air abatement, GM began construction of a new dock on the west side of the building. Excavation for the new dock was begun in late November, 1986. The excavated pit was approximately $10 \times 20 \times 6$ deep.

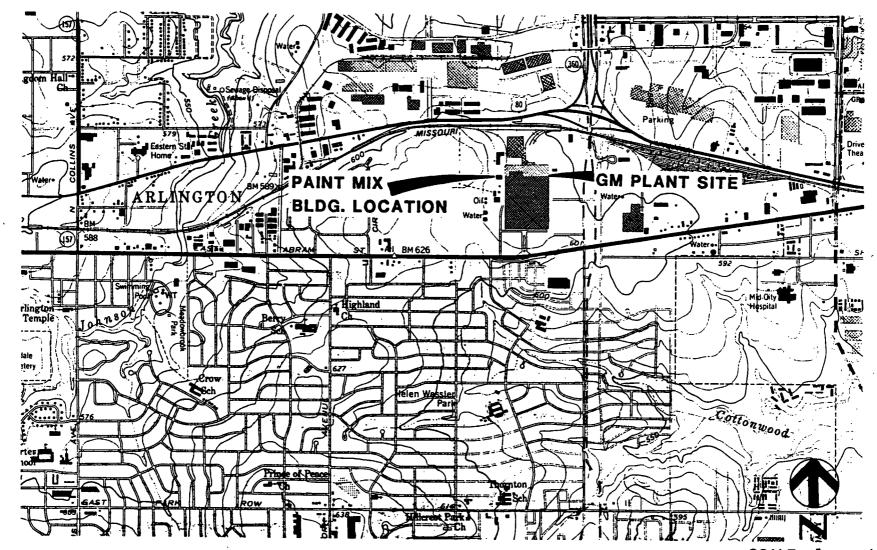
A spill of paint thinner occurred in the Paint Mix Building and subsequently collected in the open excavation pit. GM notified the TWC during the first week in December and proceeded to clean up the spill by removing all liquid thinner and contaminated soil. After the spill had been cleaned up, GM personnel noticed that water was seeping into the excavation and had a "solvent" smell. As a result, a grab sample of the water was obtained on December 8th and analyzed by Southwestern Laboratories (SWL) for organics. In addition, samples of the excavation subgrade soil were collected and analyzed. Results of the analyses indicated that the seepage water was heavily contaminated with thinner components including toluene, xylenes, and methyl ethyl ketone.

Once these initial sampling results were obtained, GM hired HDR Infrastructure (HDR) to initiate a comprehensive sampling survey to determine the extent of vertical and horizontal migration of the contaminants and to determine the most feasible remedial action to implement.

B. Site Physiography

1. General

The GM Plant is located in Arlington, Texas which has a relatively flat rolling topography (Refer to Figure II-A-1). As illustrated in Figure II-A-1, maximum relief, within a one-mile radius of the plant, is approximately 80 feet. The highest point, 630 feet above mean sea level (MSL), is located west of the plant along Circle Drive. The lowest point, 550 feet above MSL, is located southeast of the plant in an area east of State Highway 360 between Abrams and East Park Row Boulevards. The plant is situated on relatively flat land at an elevation of approximately 603 feet above MSL. In general, relief increases to the west and southwest and decreases



SCALE: 1"= 2400'



LOCATION MAP

FIGURE II-A-1

to the north, east and southeast.

The plant is located within the Trinity River Drainage Basin. The area north of the plant is drained by the West Fork of the Trinity River. The area south and east of the plant is drained by Cottonwood Creek, which empties into Mountain Creek Lake. The lake is situated in Grand Prairie, Texas approximately 6 miles east of the plant.

Surface drainage from the plant is collected and discharged into the City of Arlington's storm sewer collection system located on the north side of the property.

2. Site Specific Physiography

The Paint Mix Building is bounded on the east by the main assembly building, on the south by miscellaneous utility buildings, on the west by open areas and on the north by warehousing and salvage buildings. Topography of the areas north and south of the Paint Mix Building is similar to the area around the Paint Mix Building. The area immediately to the west rises approximately 10 to 15 feet above the ground elevation at the Paint Mix Building.

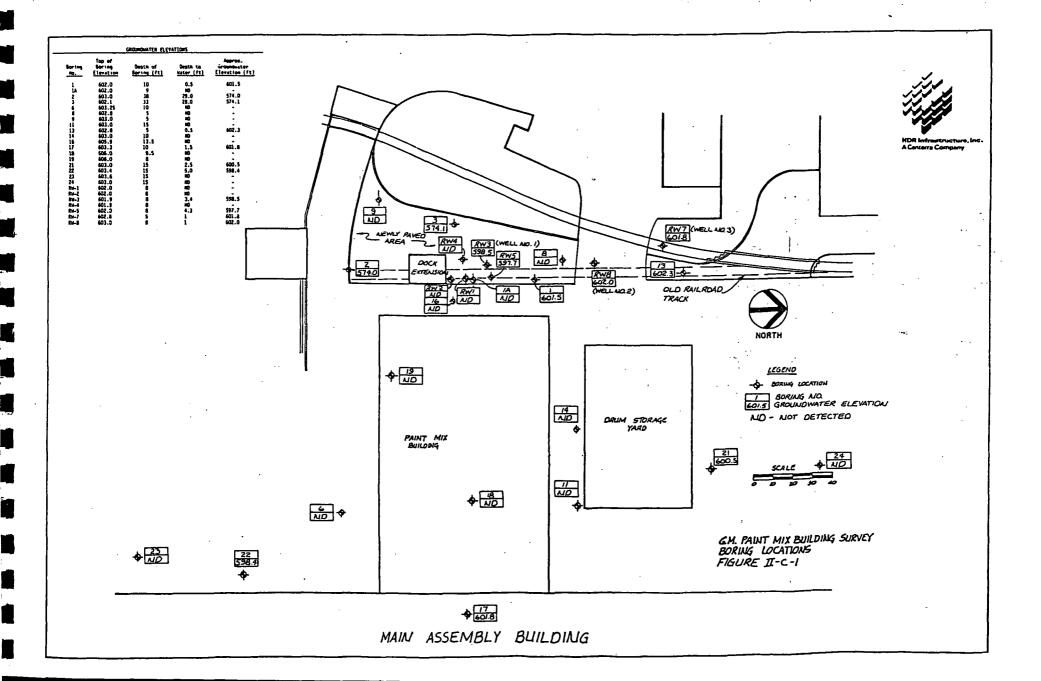
Surface elevations around the west end of the Paint Mix Building vary from 603 feet above MSL at the south end to 602 feet above MSL at the north end. Drainage around the Paint Mix Building is directed west to the railroad spur where the drainage is directed northward along the railroad bed to a storm sewer inlet. Runoff from the high area west of the Paint Mix Building is intercepted by a drainage culvert located at the base of the rise and directed northward.

A spur of the plant railroad system had, until recently, run along the west side of the Paint Mix Building (Figure II-C-1). The rails and ballast were removed several years ago but, the gravel base was left in the ground.

C. SITE HYDROGEOLOGY

1. General

Geology of the Arlington area consists of two cretaceous system formations, including the Woodbine and Eagle Ford Groups. The Eagle Ford Group is approximately 100 feet thick and overlies the Woodbine Group which is approximately 300 feet thick. The Eagle Ford Group consists of shale, limestone, clay and marl and yields only small amounts of water in localized areas (TDWR Report 269, 1982). The Woodbine Group is composed of friable, ferruginous, fine-grained sand and sandstone with interbedded shale, sandy shale, and laminated clay. The upper part of the Woodbine displays a marked increase in shale and clay, while the lower portion exhibits a more sandy make-up.



The Woodbine Group is the only formation in the area which has been significantly used as a drinking water source in the past. Water use records, published in TDWR Report 269, indicate that public groundwater consumption in Tarrant County from the Woodbine formation declined from a peak of 90 acre-ft/year in 1964 to 14.3 acre-ft/year in 1976. The City of Arlington currently obtains water from a surface water supply. Wells in the Woodbine formation tend to yield moderate quantities of water averaging 50 gallons per minute. Water quality of the Woodbine formation is generally good with total dissolved solids generally less than 500, chlorides less than 150 and sulfates less than 100 mg/l.

The primary source of groundwater in the Woodbine formation is rainfall on the outcrop area which runs north and south from Cleburne through west Arlington to Denton, Texas. Movement of groundwater is typically to the east-southeast. Groundwater movement has been estimated to be 15 feet per year (TDWR Report 269, 1982).

2. Site Specific Hydrogeology

Locations of soil borings, completed during the site survey, are shown on Figure II-C-1. Top of boring elevation, depth of boring, depth to top of groundwater (static) and approximate groundwater elevations are shown on the drawing.

Review of the geotechnical report, prepared by SWL, on the soil borings indicates that the area is underlain by a 1 to 2 foot layer of fill on top of a 30 to 40 foot layer of tan and gray silty clay which is situated over the Eagle Ford Shale Formation. Figure II-C-2 graphically presents a profile of the west loading dock area.

Groundwater was encountered in two district areas during the survey. A layer of perched water was encountered in an area at the northwest corner of the Paint Mix Building. This perched layer was encountered at a depth between 602 feet MSL on the north end and 598 feet MSL on the south end. Examination of borings indicated that seepage began at a level of approximately 1 foot in depth in the area north of the Paint Mix Building which coincided with the depth of granular base left over from the old rail spur. Seepage into southern most borings is occurring at a depth of 3 to 4 feet.

The second layer of water encountered was situated on top of the Eagle Ford Shale Formation at an elevation of approximately 574 feet MSL. The lower and upper water layers encountered at the site are separated by a 30 foot layer of silty clay. Review of geotechnical boring logs indicates that the clay contains intermittent vertical limestone and siltstone seams extending as deep as 10 feet. However, even though these seams are porous, the stability and presence of perched water observed and the presence of 30 feet of clay suggests that the clay layer serves as an aquaclude or barrier to vertical migration of perched groundwater.

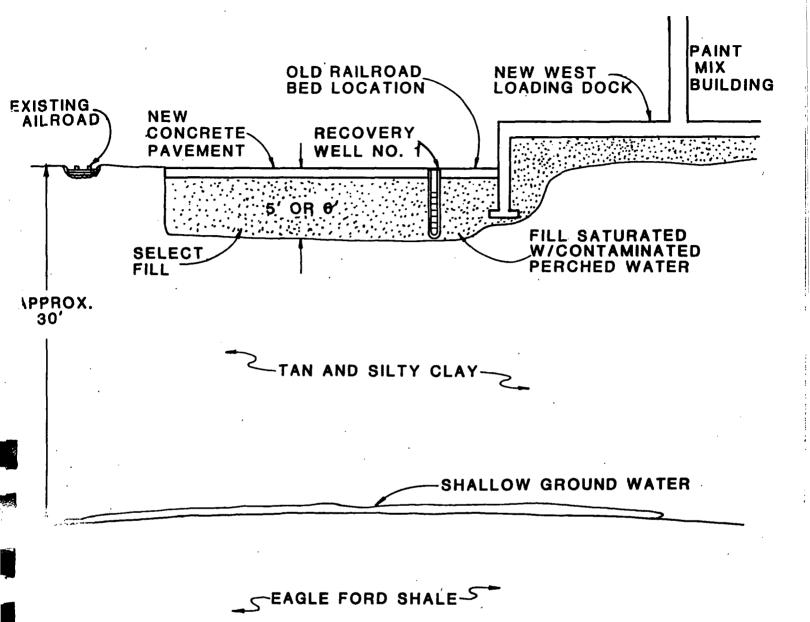


FIGURE II-C-2
PAINT MIX WEST DOCK
GEOLOGICAL PROFILE
NO SCALE

Water in the perched layer appears to be derived primarily from rainfall runoff entering the existing rail bed and spreading under the pavement along the old rail bed to the south towards the Paint Mix Dock. Perched water movement does not appear to occur under normal circumstances unless an excavation is made which allows the water to flow. Under normal conditions, the ground is saturated with water, especially around the existing and old rail bed.

Three (3) four-inch observation/recovery wells were constructed on March 2nd and 3rd, 1987. Eight (8) initial 7-1/2 inch diameter borings were completed at various locations in an attempt to locate the most productive contaminated perched layer well. Each boring was monitored with an organic vapor detector and water samples were collected from each wet hole. Borings RW-1, 2, 4 and 6 were dry holes and were not sampled. Borings RW-3, 5, 7 and 8 were wet and groundwater samples were obtained for volatile organic analysis (Refer to Figure II-C-1).

Three (3) four-inch PVC wells were constructed in borings RW-3, RW-7 and RW-8. Locations for well placement were decided based upon yield (flow rate) and organic vapor levels. RW-3 and RW-5 indicated high volatile organic levels while indicating low yields. RW-7 and RW-8 indicated high yields while indicating low organic levels. Yield tests were conducted by pumping the liquid level down, timing the recovery and measuring the water volume. Data from the tests for RW-3 and RW-5 indicated an average of approximately 0.1 gpm recovery rate for RW-3 and 0.05 gpm for RW-5 prior to well placement and development. RW-3 was selected for well placement based on the higher yield. RW-7 and RW-8 were also selected for well placement based upon location and high yield.

Construction of the wells was completed on March 3, 1987. Wells were numbered based upon location with Well No. 1 located in Boring RW-3, Well No. 2 in Boring RW-8 and Well No. 3 in Boring RW-7. The wells were developed to a depth of 6 feet with casing which was screened in the lower 4 feet and gravel packed the entire depth.

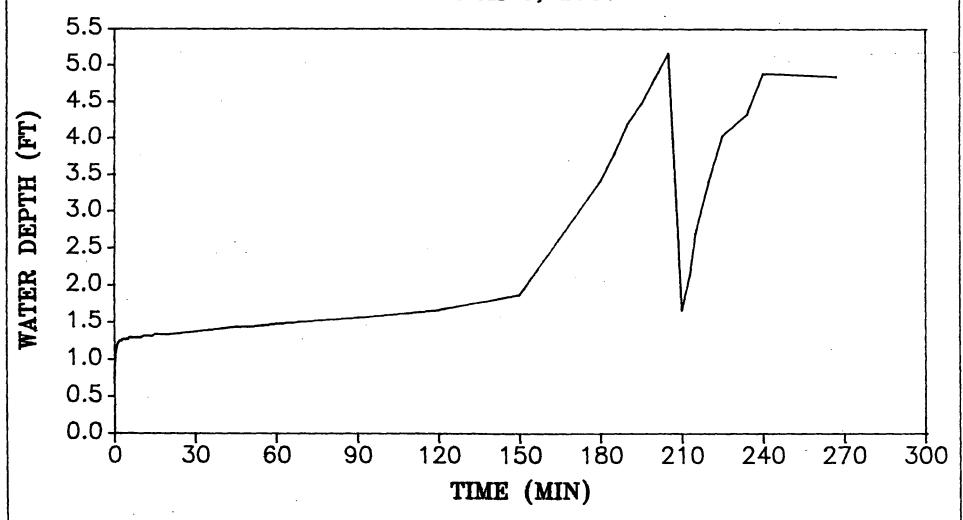
Pump tests were conducted in Wells No. 1 and 2 based upon the proximity of the wells to the Paint Mix Building. Well No. 3 was placed to serve as a monitoring well, if required. Pump tests were conducted on March 5th and 6th and indicated an average flow of 0.3 gpm at a depth of 2.8 ft from Well No. 1 and 1.3 gpm at a depth of 5.0 ft from Well No. 2.

Maximum drawdown of Wells No. 1 and 3 during Well No. 2 pump testing was 1/2 and 3 inches respectively. Results of Well No. 2 pump test indicate that a "pool" of water exists within the top 2 feet of the ground surface which yields higher flows without drawdown until the layer is exhausted. Figure II-C-3 presents results of a pump test conducted on March 5, 1987, which exhibits this phenomenon.

Maximum drawdown in Wells No. 2 and 3 during Well No. 1 pump testing was 1/2 and 0 inches respectively. Well recovery rate was measured by pumping down, timing the recovery and measuring the



WELL NO.2 PUMP TEST DATA MARCH 5, 1987



PUMP LOST PRIME AT 205 MIN CONSTANT PUMPING AT 1.75GPM THRU 225MIN PUMP REDUCED TO 1.51GPM FROM 225-416MIN

FIGURE II-C-3

water volume removed. Results of recovery tests conducted on March 6, 1987 are presented in Figure II-C-4 and indicate an average recovery rate of 0.25 ft/min or 0.3 gpm (1.24 gal/L.F.) when the level is maintained below 2.8 feet.

D. CONSTRUCTION ACTIVITIES

As mentioned previously, construction of the new dock resulted from the construction of a thermal oxidizer in the area adjacent to the south dock of the Paint Mix Building. Construction of the thermal oxidizer was begun in early January and is expected to be completed by the end of the summer.

In order to have the Paint Mix Building in service during and after the thermal oxidizer construction, a new dock was designed to be placed on the west side of the building. Excavation was begun in late November, 1986 and construction of the dock was completed by the end of March in order to open the plant for business on March 2nd, 1987 after an extended shutdown period began at Christmas, 1986.

Construction of the new dock included a new access drive for truck traffic. The area paved is shown on Figure II-C-1 and is bounded on the north by the access road just north of Boring No. 8 and on the south by the access road adjacent to Boring No.'s 2 and 9. Since perched water was seeping into the excavation pit, a concrete dam was constructed immediately north of the excavation which allowed the construction to continue. All seepage water was drummed, stored, sampled and disposed of in accordance with RCRA regulations. Once the dock was completed, the concrete dam was removed along with the gravel base material and surrounding topsoil and replaced with select fill in preparation for concrete pavement placement. All excavated materials were stored on and covered with polyethylene sheeting to prevent spreading of any contaminants. Disposal of the material is pending return of sampling analyses. Concrete pavement placement was completed in late February.

E. SUBSURFACE CONTAMINATION

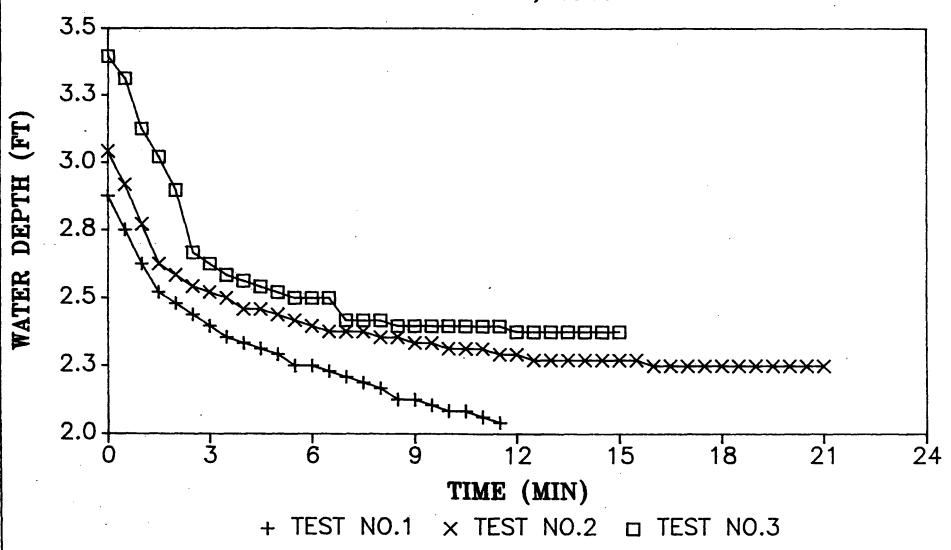
Samples were collected by HDR during several field surveys beginning on January 9, 1987. Additional samples were collected previously by GM and SWL personnel and the analytical data has been included.

Tables II-E-1 and II-E-2 present all inorganic and organic sampling data collected. Review of the analytical results indicates that the majority of the contamination is centered around the excavation pit. Highest concentrations of contaminants were obtained in soil samples taken from the abandoned railroad ballast granular base. Seepage water, which entered the excavation pit, originated from this granular fill seam which was exposed during excavation of the new dock foundation.

EP-Toxicity analyses were completed on samples which indicated the highest metal levels. Review of the EP-Toxicity results indicated that no metal contamination exists in the soil and water samples obtained at concentrations exceeding the EP-Toxicity limitations.

GM ARLINGTON PAINT MIX

WELL NO.1 PUMP TEST DATA MARCH 6, 1987



WELL PUMPED DOWN TILL SUCTION BROKEN
PUMPED VOLUME RECORDED & LEVEL MONITORED
DURING RECHARGE

FIGURE II-C-4

GM ARLINGTON PAINT MIX SURVEY

INORGANIC ANALYTICAL RESULTS FROM NDRC AND ALLIED LABS

Total Concentration (ppm)

						Total Co	ncentra	tion (p	om)							
Sample #	Antimony	Arsenic	Barium*	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	<u>Nickel</u>	Selentum	Silver	Thallium	Zinc C	Cyanides	
1-Water, 8'	-	0.03	•	-	< 0.01	< 0.05	-	< 0.1	-	< 0.05	-	-	• -	0.29	-	
1-Soil, 1'	-	0.16	-	-	0.31	7.36	-	9.0	-	31.4	•	-	-	120.0	•	
1-Soi1, 5'	. •	0.08	-	-	0.26	5.79	-	9.0	-	46.9	-	-	-	57.20	•	
IA-Soil, 1'	•	0.09	•	-	1.48	25.63	-	7.2	-	37.7	-	•		324.0	-	
(Total) 1A-Soil, 1'	-	-	1.30	-	<0.05	0.008	_	< 0.05	-	-	-	-	•	-	-	
(EP-Tox) IA-Soil, 4'	-	0.08	-	-	1.16	5.60	-	20.4	-	41.9	-	-	-	35.6	-	
1A-Soil, 9'	-	0.04	-	-	1.14	7.46	-	20.4	-	41.7	•	-	-	42.1	-	
2-Soil, 2' (Total)	30.0	0.11	•	0.1	0.29	19.8	4.18	248.0	0.005	25.0	<0.01	3.76	23.8	31.2	0.01	
2-Soil, 2' (EP-Tox)	-	-	0.94	•	-	0.080	-	<0.05	-	•	-	•	-	-	-	
2-5011, 6'	-	0.11	-	-	0.27	5.6	-	10.1	•	28.9	-	-	-	34.8	-	
2-Water, 29'	0.5	0.24	•	<0.1	< 0.01	< 0.05	0.18	0.20	< 0.001	0.05	< 0.01	< 0.01	<0.05	0.36	<0.01	
3-Soil, 2' (Total)	-	0.05	-	-	1.53	6.08	-	17.3	-	47.1	-	-	-	36.4	-	
3-Soil, 2' (EP-Tox)	-	-	1.30	-	< 0.05	< 0.005	-	< 0.05	-	-	-	-	-	-	-	
3-Soil, 7.5'	•	0.09	•	-	0.92	6.28	-	12.8	-	38.1	-	•	-	39.6	•	
3-Soil, 12.5	i' -	80.0	-	-	1.36	4.33	-	14.0	-	41.3	•	-	-	37.6	-	
3-Soil, 22.5	;· -	0.13	-	-	0.62	6.08	•	14.6	-	35.1	-	•	-	46.8	•	
33.5	s' -	0.14	•	-	0.64	3.29	-	10.7	•	25.3	-	-	-	42.8	•	
. wasan , 33 '	-	1.02	0.25	-	0.02	<0.05	-	0.6	-	1.13	-	•	-	1.17	•	
6-So11, 5'	-	0.05	-	-	1.08	2.84	-	10.5	-	48.2	-	-		49.6	-	
8-Soil, 2'	-	0.14	-	-	0.94	3.28	-	12.2	-	26.8	-	-	-	55.6	-	
9-Soil, 5'	-	0.07	•	-	0.29	3.12	-	11.3	-	46.4	-	•	-	39.2	-	
11-Soft, 7'	0.05	-	-	-	-	2.33	-	10.4	-	82.8	-	0.35	0.05	-	•	
13-Soil, 5'	-	0.11	-	-	0.18	2.95	-	7.2	-	34.4	•	•	-	30.0	-	
13-Water, 2'	-	0.18	-	-	0.01	<0.05	-	9.3	-	0.73	-	-	-	3.5	-	
14-Soil, 1'	-	0.09	-	•	0.86	6.06	•	13.4	-	37.3	•	-	-	18.7	-	
14-Soil, 6'	-	0.05	-	•	0.82	6.08	. -	10.8	-	45.6	-	-	-	33.3	- '	
16-Soil, 4.5	10.0	11.73	•	< 0.1	0.60	1.42	6.00	40.2	0.001	22.1	< 0.01	1.33	2.67	26.8	< 0.01	
16-Soil, 8'	-	0.04	-	•	0.31	0.36	-	10.2	-	78.2	•	-	-	56.8	•	
17-Soil, 5'	-	0.05	•	-	1.04	4.99	-	13.2	-	43.8	-	•	-	41.4	•	
6-Soil, 8.3	0.05	-	340	•	-	2.33	-	10.8	-	25.6	-	2.24	0.05	-	-	
19-Soil, 7.8	0.05	-	245	-	-	4.67	-	11.5	-	31.7	• •	1.29	0.05	-	-	
21-Soil, 8'	0.05	•	275	-	•	4.67	-	15.3	-	28.9	-	0.82	0.05	-	-	
21-Water, 3'	-	0.01	1.0	-	-	-	-	0.1	•	0.05	-	-	0.01	-	-	
22-Soil, 7'	0.05	•	215	-	•	1.66	-	8.80	•	40.8	· _	0.59	0.05	-	•	
23-Soil, 8'	0.05		225	-		1.33	-	9.32	-	36.1	-	0.47	0.05	•	•	
24-Soil, 7.5	0.05	-	290	-	`-	6.00	-	8.92	•	49.4	-	0.71	0.05	-	-	

All water samples collected with teflon bailer. Deep samples (2 and 3) collected thru center of hollow stem auger. All others collected thru open boring.
Soil samples obtained using shelby tube sampler.
Sampling and boring equipment deconned before and after each sample.
(-) "Dash" = Not Tested For

⁻ Barium tests were performed incorrectly. Values shown represent samples which were subsequently rerun.

GM ARLINGTON PAINT MIX SURVEY

						GM ARI	[HGTON PA	INT MIX SU	RYEY						,				
					Analytic	•	oncentrat	llied, SML ion (ppm)	404 KD	ec Lea							•		
Date Sampled	Sample #	To luene	Lylenes	Ethyl Benzens	e her h	1,1 2(43 24)	,l Tri- roethane	Chloroform	JPA Ac	etone.	2-Hexanone f	enz joi pe	Benzo(ghi) Perylene	fluorene	Olbromo- Chloromethane	5-Methyl-2 Lexanol	(15,35,6R)- 1-)-4-Carang	irichiar-	Pnenols
	Pit Seepage Water Grab		383.00		6,054.00	•	•		7,612*		-		-	•	•	•	•	•	
	S-1,Soil 4"	1.00	1.00	_	1.00			_	_	_		_	_		_				
	5-1,Solt 16"		1.00	•	1.00						-				•				
12/8/86	S-2,Sol1 4"	5.00	14.00		14.00														
12/8/86	\$-2.Sa11 16*	1.00	1.00		1.00			-				-	-		•		•	•	
1/9/67	1-Sat1, 1'	0.0488	.315	•			0.0767		-		•			•	•	-	•	-	-
1/9/87	1-5011, 5'	0.383	. 304	•	•	•	1.1100	-	-	•	-	-	-	•	٠	-	-	•	-
1/9/87	1-Water, 8'	2.64	32.7	0.377		•	•	•	•	•	-	•	•	-	•	-	•	-	•
	1A-Soll, 1'	2170	15,900	1809	15.30	-	0.0636	0.0265	-	•	•	-	•	•	•	•	-	-	-
	1A-So11, 4"	42.7	94.4	13.9	34.00	•	0.4750	0.0179	-	•	0.012	•	•	•	•	•	•	•	• .
	IA-Soil, 9'	20.6	35.2	5.33	1.39	•		•	•	•	•	•	•	-	•	•	•	•	
1/9/87 1/9/87	2-5011, 2'	76.9 0.0544	9.86	1.554	0.0476	•	5.0900	-	•	•	•	0.15	0.237	0.15	•	•	•	-	0.01
	2-Sall, 6' 2-Mater, 29'	0.0237	0.0281	•	0.04/6	•	•	0.0112	•	•	•	•	•			·			0.01
	3-5011, 2"	0.263	0.0401	0.132			0.0469	0.0215	:	:									-
	3-Sall, 7.5'		0.0294			. •		0.0283											
	3-5011, 12.5		0.0167	0.0572			0.0063				-			-		•	•		•
	3-5011, 22.5					•	-	-	0.070					-	-	-	•	•	
1/10/87	3-5011, 33.5	٠.	0.0244		0.0896	· -					-	-	-	-		•		•	-
1/10/87	3-Water, 33'	•	•	0.0472		-	•	0.0054	•			•	-	•	•	•	•	•	•
1/10/87	6-Soll, S'	0.0055	•	•	-	•	•	-	•	-	•	-	•	-	•	•	•	-	•
1/10/87	8-Šo11, 21	15.5	85.2	4.76	0.6070	-	•	•	•	•	•	•	-	-	•	•	-	•	•
1/9/87	9-5011, 5"	.249	4.58	.224	-	•	•	•	•	•	-	•	-	-	•	-	-	•	•
1/15/87	11-5011, 7"	,0734	0.0722	0.0273	1.08	0.25	•	•	0.54 9	. 30	•	•	•	•	•	0.034	0.020	•	•
	13-5011, 5'	.0418	.0261		•	•	-	-	•	•	-	-	•	•	•	•	•	•	•
	13-Water, 2'	0.00499			•	•	•	0.0364	•	•	•	-	•	•	•	٠.	•	•	•
	14-5011, 1"	1.18	15.2	2.3	•	•	•	-	•	•	•	-	-	•	•	•	•	•	-
	14-5011, 6'	1.45	1.02	2.3 ·	0.3540	0.142	•	-	0.040	9.250	•	•	•	-					0.01
	16-5011,	0.0415	•	10.9	-	•	•	•	٠	•	•	•	•	•					•
	10.		-	-	•	•	•	•	•	•	•	•	•	•					
	17-5011, 5"	12.0	62.0	21.6	1.69	•	•	-	•	•	•	•	•	•	•	•	•	•	•
1/15/87	18-5011.7.5	0.005		0.005				-	0.250	0.063			-		•	•	•	-	•
1/15/87	19-5011, 7"	0.005		0.222	0.013		-	•	0.026	0.031		-			-	•	•	-	-
1/15/87	21-5011,5-10	0.005	•	0.116	0.504	-			1.400	0.009			-	•	•	0.190	•	-	•
1/15/87	21-Water,5-	0.005		0.005											-				
	22-5011,5-10		:	1.340	0.512	-	-	-	1.500		•	•	•	•					•
	23-5011,5-10			0.005	0.588				1.960						•	-	•	0.064	•
	24-5011,5-10			0.005				-	0.200						•	•	•	•	•
	Composite of drumed pit	0.69	0.48	0.250											• '				
1/27/87	Pit water Grab sample	1.00	0.79	0.940									-		- 1.76				
3/3/87	Boring RY-3			,															
3/3/87			22.000	2.700	0.690	•	•	•	•	•	•	•	•	•	•	•	. •	•	•
	Boring RV-5 Seepage Water 5.7*	31.000	22.000	4.000	0.574													•	
3/3/87	Boring RW-7						. *	-	-,	-	٠.	-	•	-					
	Seepage Water	٠.	•												•		-	-	
3/3/87	Boring RV-8			-															
	Seepage Water L.Q'	٠.	.0369	.0098		•	•.		-	• '					•	•	•	-	•
3/6/87	Well #1-Samp Mater, 2.3'	te 1	21.000	4.100							i.								
3/6/87	Well #1-Samp		*******	7.100	•	i ii	• • • • • • • • • • • • • • • • • • • •	5.5	, • ·	•	• .	•	• • •	:	-				
	Water, 2.3'	27.000	19.000	1.600	0.337	-	•	روزه ميخوره	•	•	•	•	•	•	•	•	•	•	•

Water, 2.3' 27,000 19,000 2,600 0,333

3/5/87 Walf #2, Water, 1.0'

WOTE: All water simples collected with teflon baller. Camp simples (2 and 3) collected thru center of hollow stem awars. All others collected thru open boring.

Sampling and boring equipment decommed before and after each sample.

Soil samples obtained using shelby tube sampler.

Soil samples obtained using shelby tube sampler.

Meil No. 3 is Boring No.2, besting No.2, besting No.2 is Boring No.8,

Meil No. 3 is Boring No.2,

Meil No.3 is Boring No.2,

Meil No.3 is Boring No.2,

Meil No.3 is Boring No.2,

Meil No.2,

Meil No.3 is Boring No.2,

Meil No.3 is Boring No.2,

Meil No.3 is Boring No.2,

Meil No.3 is No.3,

^{* -} Result has been questioned and is being reevaluated.

Review of organic results indicates the major presence of paint thinner components and the minor presence of some additional organic compounds. Highest concentrations of organics were found in the granular fill between 1 and 5 feet in depth. Organic levels in samples below 5 feet in depth indicate that little of the organics has seeped down. As indicated previously, the area is underlain by a 25-30 foot layer of shaley clay situated over a layer of the Eagle Ford Shale. Groundwater was detected on top of the Eagle Ford Shale at approximately 30 feet in depth. Review of the analytical results for the groundwater samples taken at this depth (Samples 2 and 3) indicates that virtually no contamination has occurred, especially when the sampling methodology is taken into consideration (i.e., sampled through a hollow stem auger rather than a fully developed monitoring well).

Three (3) four-inch PVC groundwater monitoring/recovery wells were installed at the site on March 3rd and 4th, 1987. Volatile organic analysis of samples collected during the installation and pump testing of the wells indicate that the organic contamination is still centered around the western edge of the Paint Mix Building. Trace amounts (less than 50 ppb) of organics were detected in the initial seepage water in Boring RW-8 (Well No. 2) but were not subsequently detected in samples collected after a 4 hour pumping test.

Evaluation of the analytical and hydrogeological data was conducted to obtain an estimate of the volume of contaminated groundwater. An estimate of the minimum volume of water involved can be made assuming that the perched water is contained outside of the Paint Mix Building foundation, bounded by the access road to the north, loading dock to the south and by the extent of pavement to the west. The total area involved would be approximately 1600 ft² and could contain approximately 2,500 gallons of contaminated liquid assuming a water layer thickness of 2 feet and a water/soil capacity of 10%. A more conservative estimate can be made assuming that the perched layer averages 3 feet in thickness and underlies an area including the building and 50 feet of area on all sides. Under these assumptions, a total volume of 100,000 gallons could be contained. Should a large cavity be discovered under the building, the volume could be greater. Assuming an average of 50 ppm of VOC's, total VOC's in the groundwater could range from 1 lb. to 40 lbs.

Given that a plentiful supply of perched groundwater is available during rainfall events, the total volume of contaminated wastewater will depend upon the leachability of the organics from the soil. Concentrations of perched organic contaminants have steadily decreased with time and could be related to their high volatility and an increased change of dilution with time.

Given that a groundwater recovery system may extract 0.3 to 1.0 gpm maximum (assuming multiple wells) from the perched water layer with average VOC levels of 50 mg/l (total), the total VOC load to be treated would be approximately 0.6 lbs/day, maximum.

F. SOURCES OF CONTAMINATION

No underground tanks nor underground paint thinner lines exist at the Paint

Mix Building. Until the most recent spill, a building drain existed which collected floor washings and drained them to the wastewater treatment system. It is possible that this line could have collected paint thinner from floor spills and leaked through loose joints. All floor drains have been subsequently plugged and washings will have to be mopped or vacuumed up in the future.

The primary source of the current contamination problem appears to be a result of the spill which occurred just after the dock foundation excavation was completed. The liquid spill collected in the excavation and flowed through the old rail spur gravel seam into the perched layer. Impermeable soils and possible void areas serve to contain a majority of the organic contamination and slowly has been releasing the contaminants into the perched water.

Tests, conducted on the bulk paint thinner, indicate the following composition:

Methyl Ethyl Ketone (MEK)	60% (weight)
Toluene	14%
Xylene	20%
Ethyl Benzene	6%

Review of the above constituents reveals that the composition of the thinner is essentially identical to the major components in the contaminated groundwater. The major difference, however, is in concentration and relative distribution. For example, although MEK is a major component of the thinner, only small quantities of MEK have been found in soil and groundwater samples except for the initial seepage test which GM ran immediately after the spill cleanup. These low MEK results could be a result of the high volatibility and solubility of MEK. All of the remaining compounds are relatively insoluble in water and may tend to adhere to soil more readily. All compounds are lighter than water and will float.

G. PATHWAYS OF MIGRATION

A survey of existing facilities around the Paint Mix Building was conducted to determine potential sources of contamination and to identify potential pathways of migration. Potential pathway areas identified include:

- Drain and waste pipeline gravel bedding
- Railroad spur gravel bedding
- Building foundations

1. Drain and Waste Pipe Bedding

Two pipelines are situated in the zone of contaminated perched water. A 12-inch VCP industrial waste (IW) pipeline in a S-N direction runs approximately 15 feet to the west of the Paint Mix Building west ramp. The IW pipeline continues to the north approximately 130 feet at a depth of approximately 2-3 feet below ground level (EL 599) and empties into a grit separator and pump station which transfers the wastewater to the industrial wastewater treatment plant.

Although samples have been obtained near the IW pipeline, no specific samples of the pipe bedding have been collected.

The second pipeline in the contaminated zone is the aforementioned Paint Mix Building drain line. The drain line has been plugged and left in place. The line runs from the location of Boring No. 18 due west to the IW line at an elevation of approximately 599 above MSL.

Soil samples collected from Boring No. 18 did not indicate the presence of any major spill from the piping at the upper end. Samples have not been collected at the lower end.

2. Railroad Spur Gravel Bedding

As mentioned previously, remanents of an old railroad spur bed were left in the ground after removal of the rail and ties. The gravel bed has been observed to be a highly saturated water area and the rail bed has been used previously to direct stormwater to the north. Thus, the rail bedding would appear to be a good pathway for contaminant travel. However, samples obtained in the rail bed (including the most recent samples) north of the Paint Mix Building have not shown any significant contamination.

Review of groundwater elevations measured recently indicate that perched water flow, if any, may be in a southerly direction and therefore would account for the non-contamination of the northern area. Since the old rail bed terminated at the Paint Mix Building, the old gravel bed is not expected to be a major pathway of contaminants. However, a monitoring well has been placed in the north gravel bed and will be used to check for movement.

3. Building Foundations

The Paint Mix Building foundation is a spread footing with a 3 to 4 feet thick grade beam around the perimeter of the building. The compacted subgrade for this foundation could serve to permit migration of contaminants around the building but would also contain the contaminants around the grade beam because of the dense clay layer under the plant.

Samples have been obtained around the perimeter of the Paint Mix Building but not directly adjacent to the grade beam. Additional sampling will be conducted, once a significant portion of the perched water has been removed, to detect possible contamination.

H. OBJECTIVES OF INTERIM REMEDIAL ACTION PLAN

The Texas Water Commission (TWC) requested in their February 10, 1987 letter, that GM prepare a remedial action plan. As indicated in the letter, a comprehensive remedial action plan was requested which addressed the following:

- 1. Characterization of the contamination
- 2. Extent of contamination
- 3. Possible migration pathways
- 4. Effect, if any, on groundwater in the area
- 5. Proposed cleanup activities.

Due to the low EP-Toxicity inorganic results, remediation is proposed only for the removal of volatile organic compounds (VOC's). Since a contaminated perched layer of water exists under or around the Paint Mix Building, additional contamination or spreading of the contaminants is likely to occur. Until a significant majority of the mobile VOC's can be removed, remediation of existing contaminated soil cannot begin. Therefore, the primary objective of this interim remedial action plan is to implement a perched water layer remediation plan to immediately begin to remove the threat of continued spread of the contaminants. Once the perched layer contamination has dropped to acceptable levels, then a second remedial action plan will be implemented to address any remaining contamination.

Until the contaminated perched layer is removed, a final determination of the extent of soil contamination cannot be made since the VOC levels could be increased by the mobility of the contaminant. Once accurate soil VOC data is obtained, a second phase remedial action plan will be developed to address the remaining contaminants.

As indicated previously, potential pathways of migration, which have not been fully evaluated, include the industrial waste pipeline bedding material, building drain line bedding material and building foundation. Additional testing will be conducted during the interim remedial action phase to determine the extent, if any, of migration. Results of these investigations will be submitted to the TWC along with one of the Monthly Interim Plan Status Reports.

Remediation of the contaminated perched water layer is proposed to be completed using a french drain system located immediately north of the west loading dock to withdraw water at a rate of approximately 0.5 to 1.0 gpm. Total VOC load removed is anticipated to be less than 1 lb. per day. Treatment of groundwater may be required for a minimum of one month to as long as six months depending upon the amount of soil VOC's which may leach with groundwater movement. Recharging of the perched water layer is expected to occur from stormwater runoff entering the railroad bed. However, should yields decrease before VOC contaminants have been eliminated, artificial recharging may be considered.

Perched water will be continuously removed until Phase II Remedial Action Plan has been completed. Treatment of groundwater will continue until groundwater VOC levels, as measured in the recovery well, are at or below the recommended maximum contaminant level (RMCL) proposed in the Safe Drinking Water Act (SDWA) Amendments of 1986. Groundwater treatment will continue for a period of one month to demonstrate compliance with the RMCL's. The following RMCL's will be used:

Constituent	Proposed RMCL (mg/l)
Ethylbenzene	0.68
Toluene	2.00

Xylene 0.44

Methyl ethyl ketone (MEK) has been exempted by the SDWA Amendments. Since MEK is less toxic than all of the above contaminants, a limit of 2.0 mg/l is proposed for MEK (ACGIH, 1985).

Contaminated groundwater will be treated in an air stripping system as discussed in the following sections. Effluent levels from the air stripper will be designed to be below the RMCL limits discussed above. Effluent from the air stripper will be sent to the industrial wastewater pretreatment system for treatment and disposal. Total VOC emissions expected from this system are anticipated to be less than 1 lb. per day.

Monitoring will be conducted on the recovery well (french drain sump) and on the discharge to the industrial wastewater pretreatment system. VOC samples will be collected on a weekly basis during the first two months, biweekly during the second two months and monthly thereafter. Samples will be collected using a teflon bailer after bailing the well a minimum of one well volume. Each sample will be subjected to a complete VOC scan. Results of all sampling will be summarized in a monthly report and submitted to the TWC for review.

Once groundwater contaminant levels have been lowered to acceptable levels, additional soil sampling will be conducted to identify soils in the area which may contain contaminants. Sampling results will be summarized and a remedial action plan submitted for approval to the TWC within 60 days of completion of the interim action plan.

III. SCREENING AND ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

A. General

Available technology for removal of VOC contaminants in water can be categorized in two general categories: those that destroy the VOC's in the water and those that simply remove them from the water. Based on flow rates and contamination levels, the general type of treatment to be utilized can be selected. As a rule, if flow rates are high (several hundred gpm) and VOC concentrations are low (less than 10 mg/l), the VOC removal processes are usually more economical and practical. Whereas, the VOC destruction processes are applicable when flow rates are low and VOC concentrations are high. Another alternative to removal and destruction is the containment of the contamination/pollution at the affected site.

A summary of remedial action techniques, associated with the three general categories described above, and which can be identified as applicable to control and/or remediation of contaminated groundwater, are presented in Table III-A-1.

In evaluating the appropriate remedial action technologies, emphasis was placed on those technologies capable of meeting the objectives and goals of the interim remedial action plan. As previously mentioned, the interim remedial goal is to remove and contain the majority of the mobile volatile organic compounds found at the contaminated site. Therefore, three technologies associated with the destruction and removal processes were

SUMMARY OF AVAILABLE REMEDIAL ACTION TECHNOLOGIES FOR CONTAMINATED GROUNDWATER

Technology	<u>Functions</u>	Applications/Restrictions
 Containment (Impermeable Barriers) grout curtain slurry wall sheet piling 	Upgradient from or around sites, diverts uncontaminated ground-water flow away from wastes. Downslope or around sites, contains/collects contaminated groundwater to limit extent of aquifer pollution or protect off-site wells.	All land disposal sites and surface impoundments with groundwater contamination; requires expensive preconstruction geotechnical evaluation, limited to bedrock depths of under 60 feet. Compatibility of wastes with grouts and, to a lessen extent, slurry walls has not been fully tested. Grouts not suitable to poorly permeable soils.
• (Hydrodynamic Control)	Contains or recovers the plume within the radius of influence of an extraction well. Creates a hydraulic barrier to groundwater flow. Allows water within the plume to be pumped, treated, and pumped back into the aquifer or discharged to a surface body.	Applicable to containment of plumes where the boundaries of contamination are well defined. Changes in plume volume and site characteristics result in costly and frequent monitoring.
· Groundwater Pumping	Plume containment and/or cleanup through pumping which effectively reverses or stops the advancement of the contaminant front. Combines containment with cleanup of affected portion of aquifer. May	Applicable to sites underlain by permeable, coarse-grained deposits. No guarantee that the approach will intercept entire plume of contaminated water. Systems are flexible and can be readily adjusted to

affected portion of aquifer. May be combined with recharge

account for changes in the plume.

TABLE III-A-1 (Continued)

Technology	Functions	Applications/Restrictions
• Biological Treatment	Destroys certain groundwater contaminants through bacterial activity.	Applicable to treatment of contaminated groundwater containing higher levels of organics. May be susceptible to shock loads. Not well suited to low or intermittent flow applications.
 Physical Treatment (Air Stripping) 	Transfer of volatile organics from the water to air through aeration, resulting in treated water with very low VOC concentrations.	Applicable to treatment of contaminated waters containing varying degrees of volatile organics. Capable of removing over 99% of volatile organics from contaminated groundwater.
(Activated Carbon)	Applicable to removal of high molecular weight organics, insoluble or nonionized organics. Limited in practice to wastes with less than 10,000 ppm organics.	Adsorption of groundwater contaminants which involves contacting groundwater with carbon, which selectively adsorbs hazardous materials by physical and/or chemical forces.
 Bioreclamation 	Bacterial degradation/removal of petrochemical contaminants and other organics as groundwater is recycled between pump stations.	Not effective for groundwater contaminated by heavy metals, certain chlorinated organics, or other nonbiodegradables; short-term treatment only; may be very costly.
· Chemical Treatment	Chemical agents commonly used to oxidize, or destroy, organic compounds include chlorine, chlorine dioxide, sodium hypochlorite, hydrogen peroxide, ozone and potassium permagnate. In some cases UV light exposure is utilized to catalyze the oxidation reaction between the VOC and hydrogen peroxide or ozone.	Most of the chemical agents do not have sufficient oxidizing power to totally destroy most of the important VOC's in a reasonable period of time.

TABLE III-A-1 (Continued)

Technology

· Thermal Oxidation

Functions

Virtually all organic compounds can be destroyed if sufficient heat is applied for a long enough period of time. This type of destruction is usually accomplished in an incinerator where both water and the end products of the VOC destruction end up being exhausted into the atmosphere as gas and vapor.

Applications/Restrictions

For typical applications, the cost of incinerating VOC contaminated water is prohibitive. Another alternative to incineration is wet air oxidation, however, this method can be highly corrosive and require equipment with exotic materials.

considered the most attractive. The technologies selected for further evaluation were a) biological treatment, b) air stripping, and c) carbon adsorption.

B. Description of Selected Remedial Action Technologies

1. Biological Treatment

It is well established that bacteria will destroy many organic compounds. This is the basis of most municipal and many industrial wastewater treatment plants.

For biological treatment to work effectively, there must be a sufficient supply of organic compounds in the water to support a population of bacteria. This generally restricts biological treatment to applications where the total organic concentration is greater than about 50 mg/l. Biological treatment of water with low concentrations of VOC's as the only organic content would be very difficult because of problems with process control, possible inhibitory effects, and problems with developing a suitable biological culture. Treatment of VOC's combined with other organic wastes, as in publicly owned treatment works, may be preferable.

Organic compounds vary widely in their biodegradability. Many VOC's are slowly biodegraded, yet substantial removals are reported in POTW's using biological treatment. Most of the removal probably occurs from stripping of the VOC's into the air and from adsorption on the surface of the biological cells, rather than from actual degradation.

Two methods of biological treatment that may be utilized in treatment of contaminated groundwaters are the activated sludge process and trickling filters.

The activated-sludge process has the capability of converting essentially all influent soluble organic matter to solids. The air activated sludge process has proven effective in the treatment of industrial wastewaters containing high concentrations of organics. Industrial wastewaters from refineries and coke pharmaceutical operations, PVC manufacturing plants, and food processing wastes have been successfully treated with the activated sludge process. Activated sludge is a possible alternative for of contaminated groundwaters, especially if the contaminant concentrations are high.

Trickling filters are currently used in conjunction with other treatment methods to treat wastewaters from refineries, pharmaceuticals, pulp and paper mills, etc. Trickling filters are well suited to treatment of low flow waste streams and are usually used as roughing filters to reduce organic loads to a level suitable for activated sludge treatment. Because of the short hydraulic residence time on the filter material, biodegradation along the filter media is generally insufficient to act as the sole means of biological treatment. By placing a trickling filter in sequence with activated sludge treatment, the filters are used to

even out loading variations while the activated sludge achieves the high removal efficiencies needed.

2. Air Stripping Technology

VOC's get their name from their common tendency to vaporize into air. This tendency makes the air stripping process very attractive.

Air stripping relies on achieving an equilibrium between volatile organic compounds (VOC) in water and air. Air stripping is most economically performed in a device called a pack tower. Figure III-B-1 shows a conceptual flow diagram of a packed tower. VOC contaminated water is pumped to the top of the tower where it is distributed over a bed of irregularly shaped plastic pieces (packing) approximately one to three inches in diameter. Air is blown into the bottom of the tower. As the liquid trickles down, it is constantly in contact with the air rising up through the packing. The degree of effectiveness of a packed tower to strip a VOC is dependent on the strippability of the compound and design of the tower. The mathematical model describing VOC mass transfer from water to air is the packing height equals the number of transfer units times the height of the transfer unit, or:

Z = (NTU) (HTU)

where:

Z = packing height

NTU = number of transfer units

HTU = height of a transfer unit

NTU and HTU factors are determined by Henry's Law Constants for each VOC, ambient pressure, liquid loading rate, air loading rate, temperature, diffusion coefficients, and media coefficients (K_{1a}) .

Henry's Law Constants for each VOC describe each compound's equilibrium partial pressure concentration in air to that compound's concentration in the water. Typically, the higher the Henry's Law Constant, the more easily is the compound stripped. Table III-B-1 lists the Henry's Law Constants for many commonly encountered contaminants including the primary compounds of concern at the GM site.

Pilot scale testing has shown that compounds with Henry's Constants greater than 50 at 20°C are relatively easy to strip. Review of the Henry's Constants for the three primary VOC compounds of concern indicate that each compound will be relatively easy to strip (Henry's Constants greater than 50). Stripping of methyl ethyl ketone is more difficult (Henry's Constant = 0.5) than the other compounds. Pilot tesing has shown that substantial removals (85% or greater) of methyl ethyl ketone can be attained by preheating the groundwater to $160^{\circ}-180^{\circ}\text{F}$ prior to stripping.

As temperature increases, so does the Henry's Law Constant (also referred to as a partition constant). Therefore, a Henry's Law Constant is referred to at a specific temperature. Kavanaugh and

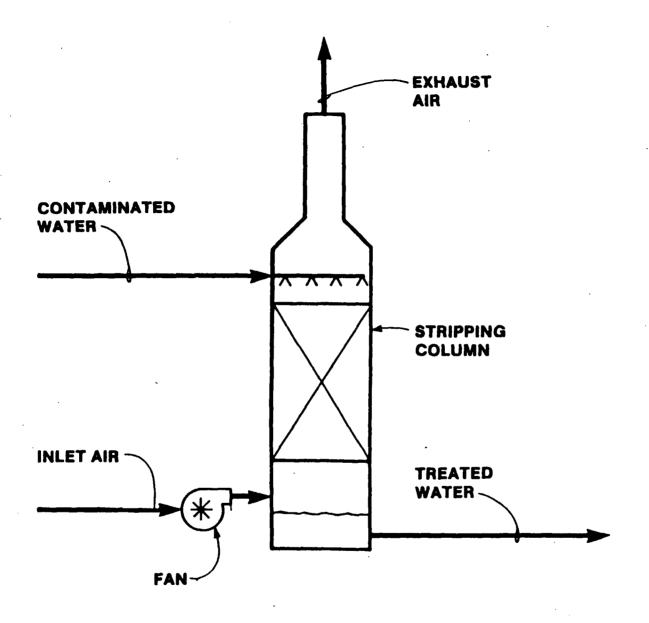


FIGURE III-B-1
CONCEPTUAL FLOW DIAGRAM
AIR STRIPPING

TABLE III-B-1 HENRY'S CONSTANTS FOR SELECTED COMPOUNDS (20°C unless otherwise noted)

Compound	Formula.	Henry's Constant (atm)
Compound Vinyl Chloride* Oxygen Nitrogen Methane Ozone Toxaphene* Carbon Dioxide Carbon Tetrachloride* Tetrachlorethylene* Trichlorethylene* Hydrogen Sulfide Chloromethane* Trichloroethane* Trichloroethane* Toluene* 1,2,4 Trimethylbenzene* Ethylbenzene	Formula CH2CHC1 O2 N2 CH4 O3 CO2 CC14 C2C14 CCHC13 H2S CH3C1 CCH3C13 C6H5CH3 C6H3(CH3)3 C8H10	Henry's Constant (atm) 3.55 × 10 ⁵ 4.3 × 10 ⁴ 8.6 × 10 ⁴ 3.8 × 10 ⁴ 3.9 × 10 ³ 3.5 × 10 ³ 1.51 × 10 ³ 1.1 × 10 ³ 5.5 × 10 ² 5.15 × 10 ² 4.8 × 10 ² 1,1,1 4.0 × 10 ² Easy 3.4 × 10 ² (25°C) to 3.53 × 10 ² (25°C) Strip 3.5 × 10 ^{2**} 2.55 × 10 ^{2**}
Xylene Benzene* 1,4 Dichlorobenzene* Chloroform 1,2 Dichloroethane* 1,1,2 Trichloroethane* Sulfide Dioxide Bromoform* Ammonia Methyl Ethyl Ketone Pentachlorophenol* Dieldrin*	C8H10 C8H10 C6H6 C6H4Cl2 CHCl3 CH3CHCl2 CCH3Cl3 SO2 CHBr3 NH3 C4OH8 C6(OH)Cl5	2.55 x 10 ² ** 2.4 x 10 ² 1.9 x 10 ² 1.7 x 10 ² 61 43 38 Difficult 35 to 0.76 Strip 0.5 0.12 0.0094

^{*} Computed from water solubility data and partial pressure of pure liquid at specified temperature.
**Estimated from vapor pressure and solubility data

Trussel in a paper titled "Design of Aeration Towers to Strip Volatile Contaminants from Drinking Water" showed a typical partition constant - temperature relationship for various compounds, with known relationships shown as solid lines and projected relationships shown as dashed lines. These relationships are shown in Figure III-B-2 and illustrate the direct relationship of Henry's Constants and temperature.

Design models for countercurrent air stripping towers at low concentrations of VOC's have been extensively described in the literature. However, most systems design criteria are typically developed based upon pilot scale testing. Design parameters which have to be selected include:

- Height and diameter of tower
- Type of packing - Packing depth
- Water and air flow rates.

For a given percent removal, a multitude of choices exists between packing depth and air/water ratio, until a flooding condition is approached. Although most efficient operation occurs at 90-95% of flooding, this point is unstable, and minor fouling can cause flooding. The flooding limit at a high molar air/water ratio depends on a manufacturer's specific packing design, and may be in the 500:1 to 700:1 range. At the higher ratio, a shorter depth of packing may be used, but the air pressure drop, and associated energy blower costs, will rise. Generally, for small air stripper units, optimum hydraulic loading rates would be 15 gpm/ft² and optimum air/water ratio would be 150 to 200:1.

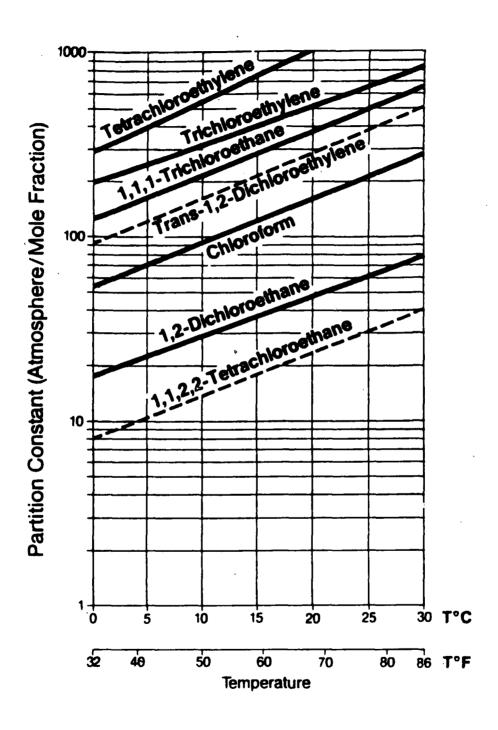


FIGURE III—B-2

PARTITION CONSTANTS FOR SELECTED COMPOUNDS VERSUS TEMPERATURE (after Kavanaugh)

Volatile organic compounds can be stripped by mechanical systems other than countercurrent packed towers, although the latter is the most common technique. Other types include diffused aeration (where air is bubbled into contact basins), coke tray aerators (where water trickles down over many trays and the coke in the trays provides a large surface area and biological growth media), and cross flow towers (where air is pulled horizontally across the packing). Although some advantages for these other units exist, such as lower construction and operation cost and lower sensitivity to fouling, countercurrent towers are used due to their higher air to water ratio design limits, which is the design key to removal of trace volatile organic compounds from water.

Practical guidelines for countercurrent packed tower design includes not only a technically correct process design, but also good structural and operation and maintenance considerations. Waters may be encountered that have differing degrees of corrosivity, aggressiveness or desposition tendencies, iron or managanese which may cause fouling, or concentrations of solvents which may cause degradation of tower components. For example, one manufacturer's tray type aerator internals has a standard spacing of 6 inches, although treatment efficiencies can be enhanced by spacings of 2, 3, or 4 inches. However, they recommend not using tray type internals if iron concentrations exceed 0.5 mg/l. This number may be modified by evaluation of the aggressiveness of the water chemistry.

Various types of internal packings are available, including an expanded flattened aluminum mesh, redwoods slats supported by redwood spacers, PVC slats on stainless steel wire grids, triangular PVC slats, corrugated PVC in stacked or formed modules, and loose fill (usually polypropylene pall rings).

A typical subjective ranking of aerator internal components, listing relative efficiency, cost, and plugging tendencies is shown below, with the lower number representing higher efficiency, lower cost, and lower tendency for plugging.

TABLE III-B-2
RELATIVE RANKING OF AERATOR INTERNAL COMPONENTS

Type of Internals	Efficiency Ranking	Cost Ranking	Plugging Factor
Pall Rings	1	6	6
MC-47	2	5	5
Redwood Tays	3	2	3
Flat PVC Slats	4	3	2
Triangular PVC Slats	4	4	1
Aluminum Mesh	5 ·	1	4

3. Carbon Adsorption Technology

Granular activated carbon and some synthetic resin materials have an ability to adsorb numerous volatile organic compounds according to a Freundlich equation of the form.

 $X/M = K C_f 1/n$

where: $X = C_0 - C_f$, or amount of compound adsorbed for a given volume of solution

M = Mass of activated carbon

 C_0 = initial mass of contaminant in untreated solution

Cf= the mass of contaminant after contacting carbon in the treated solution

The data for adsorption characteristics of a given compound is usually fitted to a logarithmic form of the above equation as follows:

 $log X/M = log K + 1/n log C_f$

where K is the X/M intercept for the isotherm plot at $C_f = 1$, and 1/n is the slope of the line when the equation is plotted on logarithmic paper.

Design criteria for carbon contactors include surface loading (usually 2 to 7 $\rm gpm/ft^2$), and a contact time between 10-60 minutes. Units are either configured in parallel or series configuration, with harder to remove contaminants (those with lower adsorption capacities) treated in series configuration.

Mechanisms behind the adsorption characteristics of organics on carbon include film diffusion, fluid phase port diffusion, internal surface diffusion, reaction with the solid surface, surface area, nature of the adsorbate, pH, temperature, interference from mixed solutes, and the nature of absorbant.

Pilot testing is often used to determine breakthrough, or the point where the mixture of organics has used up the adsorption capacity of Unlike air stripping, where each contaminant's partial pressure allows stripping of that component relatively independently from other volatile chemicals, carbon adsorption sites are relatively fixed and each contaminant competes for adsorption with other compounds. Testing should include an evaluation of the fouling tendency for water in the beds from chemicals such as iron or Sequestering agents can be added to reduce those tendencies. A typical carbon bed used in emergency response or short term or long term water cleanups may consist of a unit 5 feet wide by 7 feet high by 16 feet long containing 5000 to 10,000 pounds carbon treating 90 to 250 qpm based on a 15 minute EBCT (empty bed contact time).

Granular activated carbon contactor units have also been used to remove airborne volatile compounds resulting from air stripping units. The air flow is often heated to enhance recovery by as much as 4 to 5 times

compared to an unheated air flow. Combinations of air stripping and liquid phase carbon adsorption technologies for sites have also been used cost effectively.

C. Screening of Applicable Technologies

Developing a remedial action plan involves careful consideration and evaluation of available technologies to develop alternatives. The purpose of this screening process is to evaluate the selected remedial action technologies on the basis of technical feasibility, performance, maintenance, service life and cost criteria and to select an alternative or combination of alternatives for preliminary design and implementation.

In this section, the selected remedial action technologies are evaluated with respect to site characteristics, and preliminary recommendations made for site clean-up. Although several technologies are available, many could be eliminated.

In comparing remedial technologies as they might apply to the General Motors site specific data, a subjective analysis was performed. Each technique was rated and ranked into a relative order on the basis of engineering feasibility, effectiveness, maintenance, service life and cost. In this step, certain remedial technologies were excluded because of infeasibility, while others were singled out as most appropriate. The level of detail developed to facilitate these evaluations is sufficient only to identify comparative or relative, not absolute, differences among alternatives. A subjective comparison of these remedial alternatives and how they can be applied to the General Motor's site has been summarized and presented in Table III-B-3.

TABLE III-B-3 COMPARISON OF REMEDIAL TECHNOLOGIES

Technology	Technical Feasibility	Performance	Maintenance	Service <u>Life</u>	Cost	<u>Total</u>
Biological Treatment	10	5	8	5	8	34
Air Stripping	2	1	4	4	3	14
Carbon Adsorption	4	5	5	4	4	22

Evaluation based on a numerical scale of 1 to 10, where a value of 1 is best and a value of 10 being unacceptable.

Biological Treatment

Biological treatment processes such as activated sludge and trickling filters require sufficient water and organics to support the biological community around which the processes are developed. Based on the limited flow rate of the withdrawal well(s) and the minor concentration of the organics in the water, this particular treatment process is considered technically unfeasible for the removal of the volatile organics from the groundwater pumped at the GM site. In addition, the cost to lease and operate a package treament plant would be expensive in comparison to the quantity of water treated.

Air Stripping

Pack tower aeration is considered Best Treatment Generally Available (BTGA) by the EPA for VOC's.

Packed Tower Aeration is considered BTGA because:

- 1. It can achieve high levels (99%) or more of VOC's removal under all anticipated conditions.
- 2. Its application is not limited by climatic conditions such as temperature or geographic conditions such as space.
- 3. It is compatible with other forms of water treatment.
- 4. It may be installed either at the well head or in a central treatment plant.
- 5. Technologies are available to handle any side effects (e.g., air pollution or increased corrosivity).
- 6. The equipment is commercially available and typical of that used by the water industry.
- 7. It can be designed for economical life.
- 8. It is reasonably affordable by large public water systems, and
- 9. It has been successfully applied to the removal of VOC's in full-scale plants in the U.S.

The air stripping process is not limited as much by flow rate as the biological treatment process. Most of the VOC's to be removed from the contaminated water at GM have comparatively high Henry Constants. Therefore, the volatility of these compounds is high and will have a natural tendency to migrate from water to the air. Because of this tendency to readily volatilize, use of aeration treatment systems, such as packed towers, are the most cost effective. In addition, packed towers are capable of attaining excellent removal efficiencies. Removal efficiencies up to 99% are not uncommon.

Carbon Adsorption

Although capital costs for carbon adsorption processes can be competitive with other forms of treatment with respect to removal efficiences, operating costs are usually high. Operating costs are directly related to the reactivation or replacement of spent carbon. Carbon filters have achieved excellent results in the past on the types of organic compounds found in the groundwater at the GM site. Removal efficiencies can be as high as 99%, which is similar to air stripping.

D. Recommended Remedial Alternative

Based on the criteria used to evaluate the remedial action alternatives (see Table III-B-3), air stripping (packed column) has been selected as the most applicable technology for the interim remediation at the General Motor's site. Groundwater pumping in conjunction with air stripping will accomplish the objectives of the interim remediation program which is to remove contaminated groundwater and treat the groundwater to very low VOC levels. Groundwater treatment will continue until the in-situ groundwater VOC levels are at or below the recommended maximum contaminant levels (RMCL's) proposed in the Safe Drinking Water Act (SDWA) Amendments of 1986. Without having pilot test data to determine mass transfer coefficients, etc. for the various VOC's that need to be removed, detail design calculations can not be made at this time. However, in discussions with various suppliers of packed tower equipment, it is safe to assume that one of the smaller standard size units will be able to achieve the remedial action objectives established in this report. A typical packed tower unit, which would be appropriate for this cleanup situation, would be 10-inches in diameter, 23 feet tall, with 15 feet of packing, such as 2-inch Jaeger tripack (polyproplyene) or equivalent, and designed to handle up to 8 gpm. The unit would have an orifice distributor tray, a demister mat, and a 1 to 2 horsepower (150 to 250 cfm) blower.

The proposed air stripping system would be sized to remove VOC's to below the proposed RMCL level. VOC emissions are anticipated to be approximately $1\ lb/day$ or less.

Due to the small amount of water which can be removed on a daily basis (maximum of 1440 gallon/day) it is anticipated that the contaminated water could be either combined with makeup water and treated as it is pumped or accumulated in a storage vessel (holding tank) and batch treated when there is sufficient water to operate the tower. The advantage to having small quantities of water to treat is the water can be recycled through the air stripping device until adequate removals of the VOC's are attained.

IV GROUNDWATER TREATMENT SYSTEM DESIGN

A. General

Based upon discussions presented in Section III, air stripping is recommended as the groundwater VOC remediation technology. The groundwater treatment system is proposed to be located immediately north of the Paint Mix Building in an area adjacent to the site industrial waste pump station (refer to Figure IV-A-1).

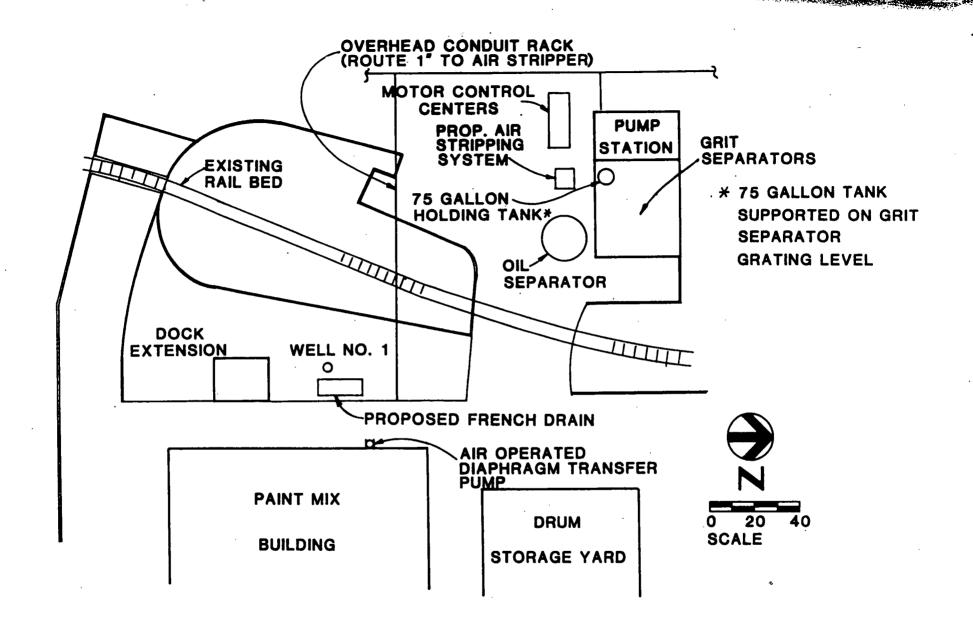


FIGURE IV-A-1
AIR STRIPPER SYSTEM LAYOUT

The groundwater recovery and treatment system will be composed of the following major items:

- French drain recovery system with centralized sump and sump pump.
- Air stripping column with 75 gallon holding tank and recirculation pump.
- Associated piping, valving, electrical and controls.

Discharge of the air stripping system will be routed to the site industrial wastewater pump station for transfer to the industrial pretreatment plant for additional treatment. Provisions will be made to allow for air stripper system effluent sampling.

B. System Design

A conceptual diagram of the proposed air stripping system is presented in Figure IV-B-1.

Collection of perched groundwater will be accomplished by constructing a 3 ft. W x 4 ft. D x 10 ft. L french drain in an area near Wall No. 1 (refer to Figure IV-A-1). Perched water will be pumped from a collection sump to the air stripper by a 1/2" air operated diaphragm pump through a 1 inch PVC transfer line which will be routed to the air stripper over an existing conduit rack.

Underflow from the air stripping column will gravity drain to a 75 gallon holding tank located on the grit separator grating level. A majority of the water will be returned to the air stripper by a sump pump. Return flow will be regulated by a valve and monitored by a rotameter. Excess flow will gravity drain to the site industrial pump station sump for transfer to the industrial wastewater pretreatment plant.

V SCHEDULING

A. General

As previously indicated in Section II-H, remediation of the Paint Mix VOC problem will be completed in two phases. Activities scheduled for the first phase are geared towards remediation of perched water layer VOC's. Second phase remediation activities will address all remaining VOC contaminants. A second phase remediation plan will be developed and submitted once the first phase has been completed.

B. Milestones

The following schedule presents an overview of key activities and milestones:

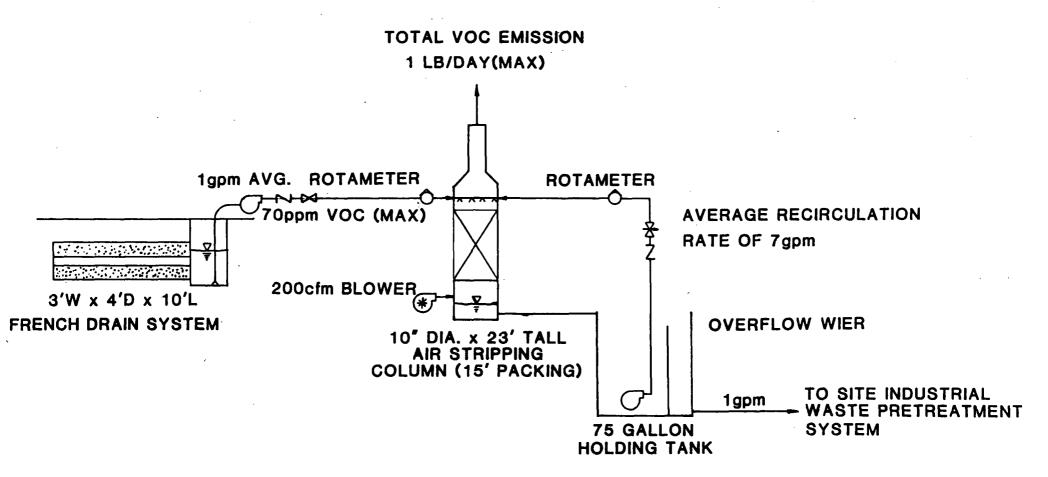


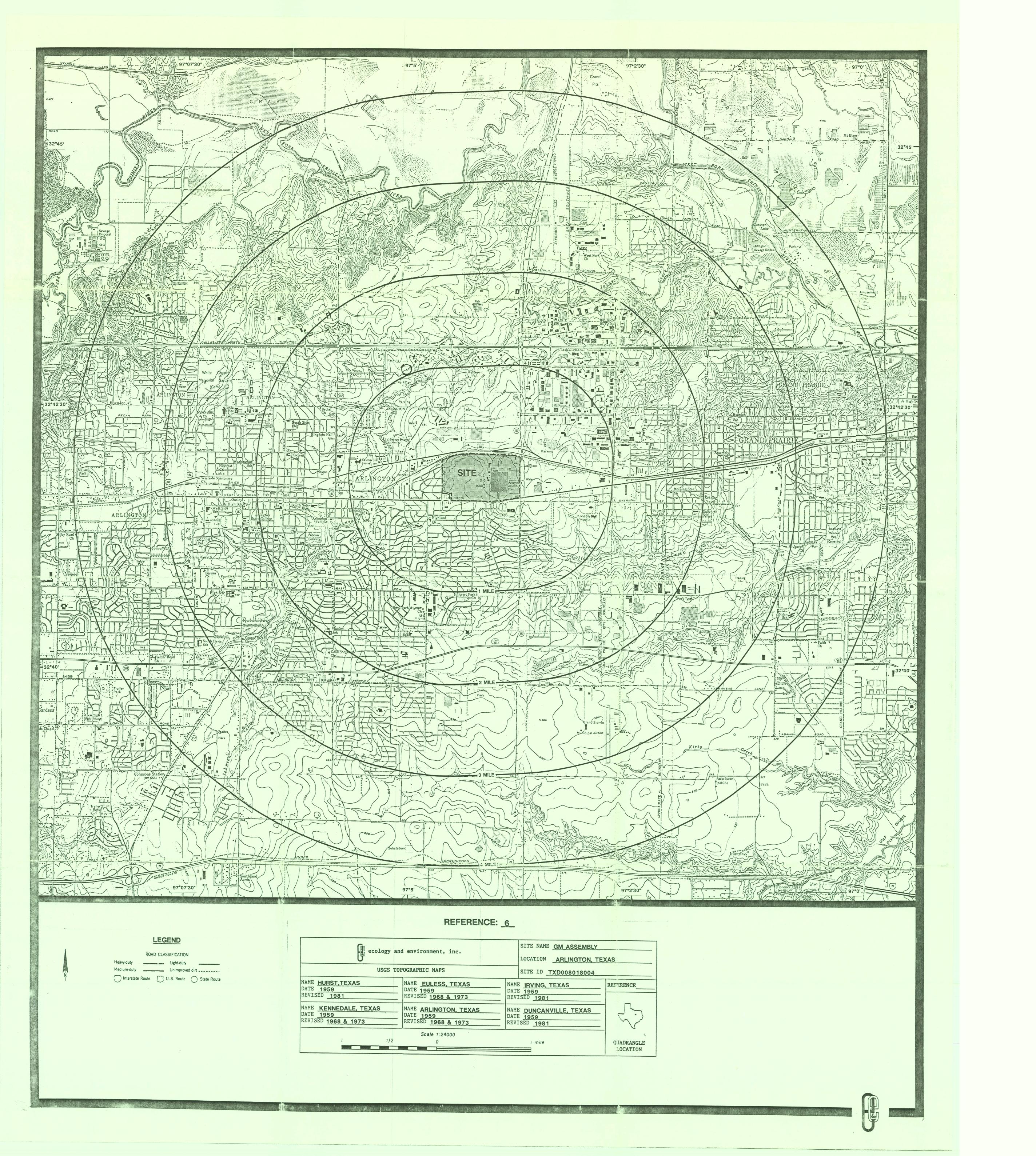
FIGURE IV-B-1
PROCESS FLOW DIAGRAM
VOC AIR STRIPPING SYSTEM

ITEMS	Scheduled Date
Receipt of Phase I TWC Approval	O Days
Start-Up of Perched Water VOC Treatment System	30 Days
Submission of Performance Report No. 1	60 Days
Submission of Performance Report No. 2 (Addt'l reports due every 30 days through life of Phase I)	90 Days
Submission of Final Performance Report, Commencement of Phase II Sampling and Remediation Plan Development, Shut Down of Air Stripper Column (Perched water removal continues).	"N" Days (Depends on time required to achieve perched water goal).
Submission of Phase II Remedial Plan to TWC	"N" + 60 Days
Start-Up of Phase II Plan	(Depends on TWC Review and Approval Time)
Submission of Status Reports	Monthly
Submission of Final Report and Termination of Perched Water Pumping	(Depends on time required to achieve Phase II goal)

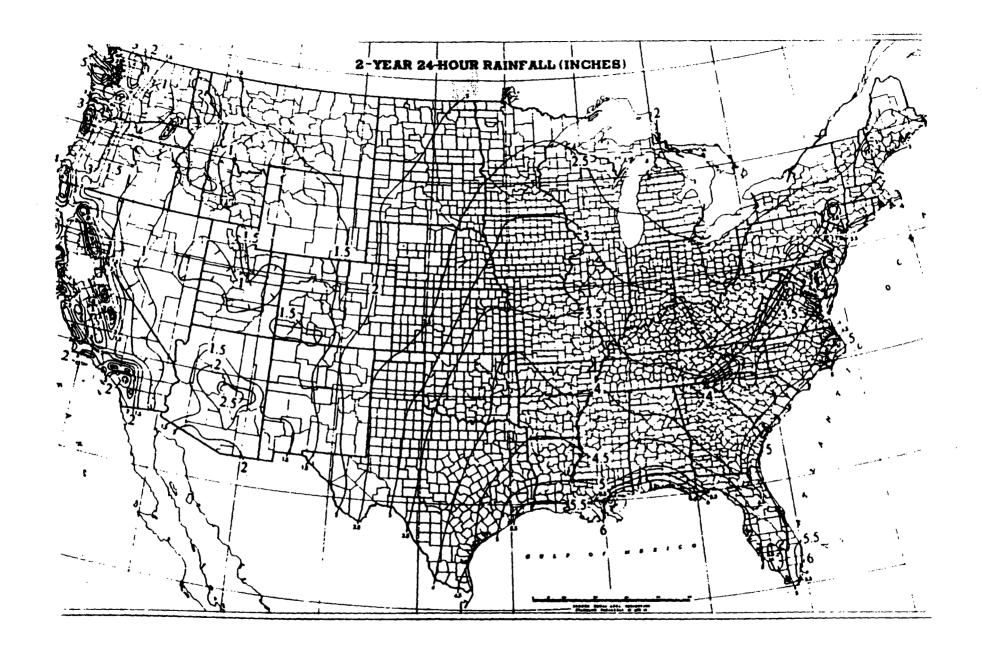
C. Interim Monitoring

As discussed previously, interim monitoring will be conducted in the following manner:

- VOA water samples will be collected from the perched water french drain sump and the air stripper effluent holding tank on a weekly basis for the first two months of operation. Each sample will be collected and analyzed for volatile organic compounds in accordance with EPA procedures.
- 2. VOA samples will be collected on a biweekly basis for the second two months and on a monthly basis thereafter.
- 3. An operations log will be kept which will record air stripper influent flow rate, perched water recovery flow rate, recirculation flow rate and water temperature on a daily basis.
- 4. Monthly status reports will be submitted to the TWC and will summarize operations data and analytical results.



Herschfield, D.M., 1961, Rainfall Frequency Atlas of the United States. U.S. Weather Bureau Technical Paper No. 40.



Uncontrolled Hazardous Waste Site Ranking System

A Users Manual (HW-10)

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United States Environmental Protection Agency

TEXAS DEPARTMENT OF WATER RESOURCES

REPORT 269

OCCURRENCE, AVAILABILITY, AND CHEMICAL QUALITY OF GROUND WATER IN THE CRETACEOUS AQUIFERS OF NORTH-CENTRAL TEXAS VOLUME 1

By

Phillip L. Nordstrom, Geologist

shows the range of constituents and properties of water from representative wells in the Paluxy Formation.

Figure 20 shows the net sand thickness of fresh to slightly saline water-bearing sand in the Paluxy. Net sand thicknesses increase from less than 50 feet (15 m) in Johnson County to 190 feet (58 m) in Denton County. Ordinarily, the most favorable areas for development of ground water would be where the saturated sand is greatest. However, due to the heavy pumpage over the past 30 years, most areas are already overdeveloped and water levels are declining at an alarming rate. The only area that seems available for increased development would be in areas of Fannin and Lamar Counties. The six public supply wells in these counties are located in an area where water from the Woodbine is saline. Well yields in excess of 100 gal/min (6.3 l/s) with pumping levels below 300 feet (91 m) are encountered.

Any Paluxy wells developed in the area of the cone of depression in eastern Tarrant County can expect pumping levels, and in some areas static water levels, to be below the top of the aquifer. Pumps are usually set near the base of the formation. Outside this area and downdip from the outcrop, water levels are declining from 4 to 12 feet (1 to 4 m) per year. Correct spacing of wells is a prerequisite throughout the study region. Any additional development of the Paluxy will result in further lowering of the artesian head in areas where the water levels are still above the formation top. In sone areas, additional development will result in dewatering of the aquifer.

Woodbine Group

The Woodbine Group is an important aquifer in the study region. The outcrop extends in a south-north direction through the center of the report area and then trends to the east parallel to the Red River. The Woodbine dips eastward where it reaches a maximum thickness of about 700 feet (213 m) and has a maximum depth of 2,500 feet (762 m) below land surface. The areal extent of the outcrop and the approximate altitude to the top of the Woodbine are illustrated on Figure 21.

The primary source of ground water in the Woodbine is rainfall on the outcrop area. This area receives an annual rainfall of from 33 inches (84 cm) in the south to 37 inches (94 cm) in the north. Other sources of ground water include surface-water seepage from lakes and streams, such as Lake Grapevine, Garza-Little Elm Reservoir, and the Trinity River tributaries.

Water occurs in saturated sand beds under both water-table and artesian conditions. Water-table conditions occur in or near the outcrop while artesian conditions prevail downdip.

Recharge to the Woodbine occurs in the outcrop area, about 1,200 square miles (3,108 km²), which consists of a permeable, sandy soil conductive to infiltration of rainfall and seepage from streams. The quantity of recharge to the Woodbine is estimated to be equivalent to less than one inch of precipitation per year on the sandy portion of the outcrop. The movement of water follows an east-southeast direction from the outcrop, generally paralleling the dip of the beds. According to Baker (1960), the average rate of water movement in the Woodbine is estimated to be about 15 feet per year (4.6 m/yr). The hydraulic gradient varies from over 30 feet per mile (5.7 m/km) to less than 13 feet per mile (2.5 m/km) within the study area except for minor local variations and for cones of depression around areas of excessive ground-water pumpage. The hydraulic gradient and a large cone of depression around the city of Sherman are illustrated on Figure 33, which also shows the approximate altitude of water levels in the Woodbine aguifer about 1976.

Discharge from the Woodbine occurs naturally through springs and seeps, evaporation, and transpiration by plants. Evapotranspiration is greatest in the summer and where vegetation is dense. Pumpage of wells constitutes most of the water artificially discharged from the aquifer and includes some flowing wells along the Red River portion of the outcrop. In 1976, about 20,500 acre-feet (25.3 hm³) of ground water was pumped from the Woodbine in the region.

The coefficients of storage, permeability, and transmissibility and the specific capacity for the Woodbine are shown on Table 4. Aquifer test locations and results are shown on Figure 26. The table was compiled from existing literature and from tests conducted by water-well drillers. Data from aquifer tests were analyzed by using the modified Theis nonequilibrium formula in conjunction with a computer program which provides a means of computing transmissibility from the water-level recovery of a step-drawdown test. The permeability coefficients were computed by dividing the transmissibility by the effective sand thickness. Specific capacities of wells were determined by dividing the yield by the total water-level drawdown measured in the well.

The specific yield was estimated using seismic methods (Duffin and Elder, 1979) in the outcrop under

water-table conditions and is on the order of 15 percent. Downdip, where the aquifer is under artesian conditions, the average coefficient of storage is approximately 0.00015, or 1.5 x 10⁻⁴. The coefficient of storage is dimensionless and indicates the volume of water that an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in the component of head normal to that surface.

Generally, the more permeable sands of the Woodbine occur on or near the outcrop, where permeability coefficients range from 84 to 167 gallons per day per square foot [(gal/d)/ft²], or 3,400 to 6,800 liters per day per square meter [(I/d)/m²]. Farther downdip, a range of 14 to 183 (gal/d)/ft², or 570 to 7,500 (I/d)/m², was encountered with an average coefficient of permeability of 44 (gal/d)/ft², or 1,800 (I/d)/m².

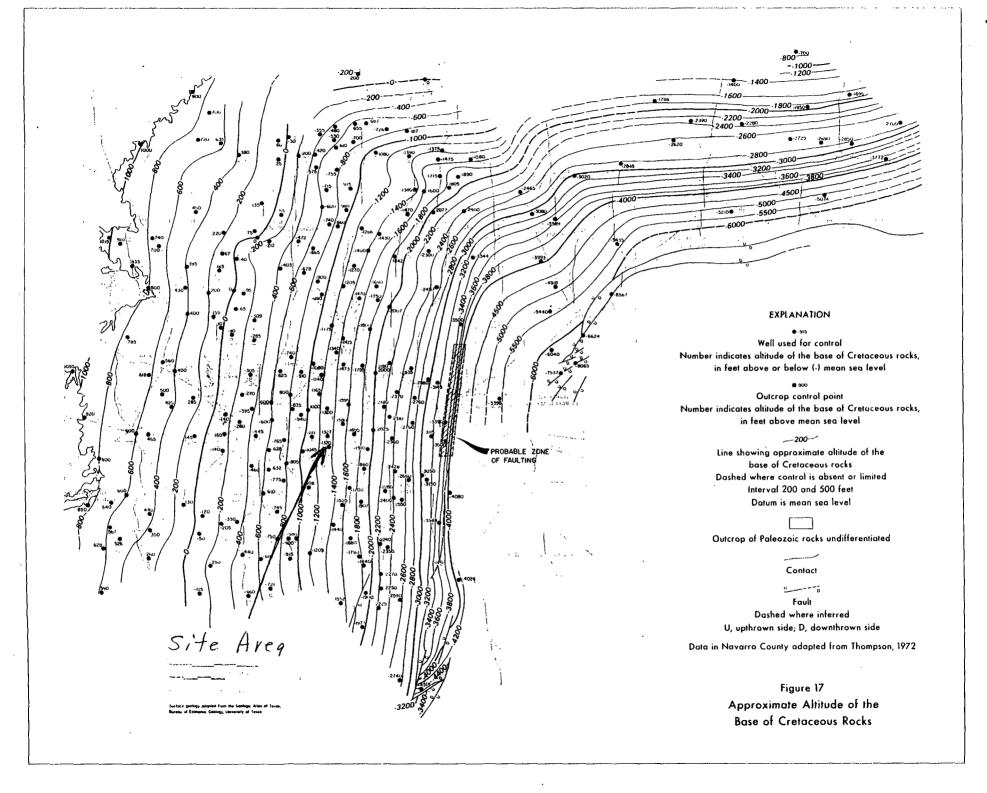
Transmissibility values are estimated to be considerably higher along the outcrop where water-table conditions exist. Two tests were conducted on irrigation wells completed in the outcrop in Grayson County and even though the tests were of short duration and thus not completely accurate, values of 7,870 and 16,700 gallons per day per foot [(gal/d)/ft], or 97,800 and

207,400 liters per day per meter [(I/d)/m], were obtained. The 24 remaining tests conducted mainly on public supply wells and utilizing data provided by the well driller showed a range of 1,320 to 14,700 (gal/d)/ft or 16,400 to 182,500 (I/d)/m and an average value of 4,700 (gal/d)/ft, or 58,400 (I/d)/m, can be expected. In 1945, the U.S. Geological Survey conducted five pumping tests (drawdown and recovery) on several Woodbine wells owned by the city of Sherman and obtained an average transmissibility of 2,400 (gal/d)/ft, or 29,800 (I/d)/m, and an average coefficient of permeability of 37 (gal/d)/ft², or 1,500 (I/d)/m².

Yields from 336 wells were measured and production ranged form 10 to 1,170 (gal/min) or 0.63 to 74 l/s. The average yield is 106 gal/min (6.7 l/s). Areas of largest production from the Woodbine aquifer are on the outcrop in Denton and Grayson Counties and downdip in Fannin, Grayson, Collin, Dallas, and Ellis Counties. Specific capacities were determined for 139 wells and ranged from 0.2 to 8.7 gallons per minute per foot [(gal/min)/ft], or 0.04 to 1.8 (l/s)/m, of drawdown with an overall average specific capacity of 2.9 (gal/min)/ft, or 0.60 (l/s)/m. The average yields and specific capacities by county are presented below:

County	Number of Wells Measured	Average Yield (gal/min)	Number of Wells Tested	Average Specific Capacity [(gal/min)/ft]
Collin	20	139	8	2.7
Cooke	8	124	2	1.6
Dallas	67	111	15	2.8
Denton	20	215	9	3.6
Ellis	24	177	11	2.2
Fannin	34	214	21	3.9
Grayson	108	223	53	3.2
Johnson	12	51	3	0.9
Tarrant	37	45	15	1.5

Water levels fluctuate seasonally as indicated by the periodic measurements in a number of observation wells completed in the Woodbine Group. Changes in water levels are illustrated by hydrographs. Water levels in the outcrop seem to recover to static level each year whereas wells in the downdip area reflect yearly declines. Long term water-level changes under water-table and artesian conditions are illustrated by Figures 7 and 10. The approximate altitude of water levels in Woodbine wells around 1955 is shown on Figure 34.



RECORD OF COMMUNICATION (214) 298-6171	(Record of Item Checked Below) x Phone CallDiscussionField ConferenceOther(Specify)	i Trip		
TO: Tim Sewell Environmental Quality Specialist, Texas Water	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/24/89		
Commission, Duncanville, Texas	naymona wayne, iii nyarorogrot	Time: 10:45 AM		
SUBJECT: G. M. Assembly	- PA (TXD008018004)			
SUMMARY OF COMMUNICATION				
He inspected the site fo	or the TWC up to about a year ago (Pa	aul Cooper is		
in charge of it now).				
There is no on-site resi	dential population. The site has a	security fence		
(and a separate security	fence around the drum storage area)	and security		
guards. It would be dif	ficult for an off-site resident to g	gain access		
to the site.				
Residential housing in t	he area is a mix of single family an	nd multifamily.		
He is not aware of any spills, or remedial action at facility other than:				
1) Loading dock spill	1) Loading dock spill (tank inside building spilled; may have been			
previous spills fr	om this area, but no documenation)			
2) Underground tank s	pillage earlier this year			
3) Closed lagoon				
4) Drum storage areas (one closed, one active).				
CONCLUSIONS, ACTION TAKEN OR REQUIRED				
INFORMATION COPIES TO:				

EPA FORM 1300-6 (7-72) Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Ref. 11 DE TS

CLOSURE CERTIFICATION REPORT

INDUSTRIAL WASTEWATER EQUALIZATION LAGOON

General Motors C-P-C Arlington, Texas

January, 1986







Chevrolet-Pontlac-Canada Group
Arlington Plant
General Motors Corporation
2525 East Abram Street
Arlington, Texas 76010-1390

January 10, 1986

Executive Director Texas Water Commission P.O. Box 13087 Capitol Station Austin, Texas 78711

Re: Industrial Solid Waste Registration No. 30347 Closure Certification of Industrial Wastewater Equalization Lagoon

Dear Sir:

To the best of our knowledge and belief, General Motors C-P-C has completed the lagoon closure in accordance with the referenced closure plan. The closure operation was conducted as detailed in Section B of the attached closure certification report.

Should you have any questions, please call.

Respectfully submitted,

Don Wise

Plant Engineering Manager

General Motors C-P-C Arlington

Thomas R. Caldwell, P.E.

-Inomes R. Coldwell

Project Manager

HDR Environmental Technologies, Inc.

GENERAL MOTORS CORPORATION

C-P-C ARLINGTON

WASTEWATER EQUALIZATION LAGOON CLOSURE

SECTION	CONTENTS
A	CLOSURE PLAN
В	LAGOON CLOSURE SUMMARY
, C	LAGOON CLOSURE CERTIFICATION
0	LABORATORY REPORT
E	HAZARDOUS WASTE MANIFEST DOCUMENTS

A. CLOSURE PLAN

I. FACILITY INFORMATION

The General Motors Assembly Plant is located at 2525 E. Abram Street, Arlington, Texas 76010. The facility contact is Donald W. Tunstall, 817/649-6350. A plant plot plan is attached as Attachment A.

The Arlington Plant is engaged in the assembly of passenger automobiles and includes operations involving spot and fusion welding, metal coating, prime and color painting, and the mechanical fastening of various fabricated parts. The various manufacturing processes, which include zinc phosphating, paint spraying booths and stripping systems, acetylene generators, electroplated priming, boiler system blow down, and a deionized water production system generate wastewater that is treated prior to discharge to the Trinity River Authority waste treatment plant.

Wastewater from the zinc phosphating process is pretreated in an industrial wastewater pretreatment facility. Caustic is added to raise the pH and a flocculent polymer is used to promote solids settling in a clarifier. The solid sludge is sent off-site to an approved landfill for disposal. The treated phosphating wastewater is discharged to the trade waste sewer system, into the grit separators, and then into the industrial wastewater lagoon.

In addition to the treated phosphating wastewater, the various plant process wastewater discharges flow into the duplex grit separator via the trade waste sewer system. The grit separators are two 10,000 gallon open top tanks with drag bars and skimmers which allow settlement of most solids from the liquid waste stream. The drag bars and skimmers remove any floating and settled solids that accumulate in the separators. Approximately 60% of the trade waste has been previously "treated" for pH adjustment that induces settling of the solids.

The solid waste collected from the grit separators is sent off-site to an approved waste landfill Liquid wastes disposal. are pumped into compartment, concrete industrial wastewater equalization The lagoon. first compartment allows additional settlement of solids not removed in the grit separator and overflows into a secondary settling compartment which provides even further solid settlement. clarified overflow of the second compartment enters the sanitary sewer system by gravity.

I. FACILITY INFORMATION (Continued)

sludge During normal plant operations, the accumulates in the concrete lagoon is removed once each year and sent off-site to an approved landfill for disposal. The sludge is a listed hazardous waste under the Resources Conservation and Recovery Act regulations of the U.S. Environmental Protection Agency and the Industrial Solid Waste Rules of the Texas Department of Water Resources. The EPA waste identification number is sludges generated from the treatment electroplating operations; the Texas number is 950110. A copy of the waste analysis of the sludge is attached. (See Attachment B.) The results of the analysis indicate that the sludge, even though it is a listed hazardous waste, does not exhibit any hazardous characteristics.

General Motors is in the process of constructing a new industrial wastewater pretreatment facility to replace existing facilities including the concrete lagoon. Therefore, the lagoon will be closed according to the requirements of Sections 335.213, .214, .215, .216, .233 and .286 of the Texas Industrial Waste Management Regulations.

The estimate of maximum waste inventory in the lagoon is the maximum capacity of the lagoon as shown below. However, it is estimated that at the time of closure the inventory will be 226,000 gallons of wastewater and 2,000 cubic yards of F006 sludge.

II. EXISTING FACILITY CONSTRUCTION

The original earthen wall lagoon was excavated in 1954. In 1965, it was lined on the sloped walls and bottom with reinforced concrete; and it was divided into two compartments by the addition of a concrete dam. The gallons (475,000 total capacity is 630,000 gallons-primary settling compartment, 155,000 gallons-secondary settling compartment). Drainage holes in the face of the dam wall allows liquid to flow from compartment one to compartment two. A sump at the outfall end of compartment two provides gravity feed of overflowing liquids to the sanitary sewer system. Attachment C.

III. CLOSURE PLAN

A. Removal of Lagoon Materials

The wastewater in the lagoon will be removed by pumping it to the municipal sewer system, which currently receives the normal overflow on a continuous basis. Care will be taken to assure that the discharge does not exceed the City of Arlington pretreatment limits. The solids remaining in the impoundment will be removed and hauled off-site for disposal at a properly licensed facility. The volume of sludge is estimated to be approximately 2,000 cubic yards.

The sludge, concrete structure, and one foot of underlying soil will be removed by a contractor who. is an authorized hazardous waste transporter and disposer. He will supply the labor, equipment and material necessary for the pumping and/or dredging the lagoon and demolition of the structure. The contractor will provide subsequent transportation and disposal of the sludge and excavated debris which is collected. The total quantities of concrete and soil to be removed are estimated to be approximately 3,700 cubic feet and 11,000 cubic feet, respectively.

The contractor will comply with the applicable Federal, State and local laws and regulations for the handling, transportation and disposal of the materials.

The contractor will be prepared to contain any spills that might occur during these operations and will recover any spills, residuals, and clean-up materials from any spills which might occur. This material shall be recovered and placed in an appropriate containment.

Disposal of hazardous waste will be at a licensed hazardous waste disposal facility or facilities, where the materials will be disposed of in compliance with applicable Federal and State Regulations.

٥

III. CLOSURE PLAN (Continued)

B. Underlying Soil Testing

After the excavation activities listed above have been completed, samples will be collected fifteen locations and at four depths at each location under surrounding and lagoon. the Approximate locations of sampling locations are shown in Attachment D. Attachment E illustrates the depth at which samples will be collected at each location. In addition, soil samples will be collected at six locations around the lagoon area (see Attachment A) by grab sampling of the layer immediately below the topsoil or root zone. The six samples shall be composited in equal parts to form one background sample for analysis.

The uppermost samples of each set of lagoon subsoil samples will be analyzed for hazardous waste characteristics as outlined in Section 335.62(2) of the Texas Industrial Waste Management Regulations, 40 CFR Part 261, Subpart C, and for the following additional constituents: nickel, zinc; and pH. If any of these analyses indicate that the lagoon subsoil exhibits hazardous waste characteristics, or constituent levels that exceed ten times the average background levels, the next depth of sample from each set of samples will be analyzed for these same parameters. Analysis will be continued with the next depth until the remaining subsoil reaches the above levels.

Underlying Soil Removal

After the evaluation as described in IIIB above, a determination of the amount of additional subsoil to be removed, if any, will be made based on the analytical results. These results and the extent of soil removal will be kept on file for Agency inspection. The procedure to be followed in removing additional subsoil will be the same as that for removing the first foot of subsoil.

The amount of additional subsoil to be disposed can only be estimated when the soil analysis has been completed and will be determined based on the closure procedures for this facility.

III. CLOSURE PLAN (Continued)

D. Decontamination of the Structure and Equipment

The equipment, which may be power shovels and/or front end loaders, used during closure will be decontaminated by scraping and washing.

Solid material cleaned from the equipment is estimated to be less than 5 cubic yards and will be disposed of with the other hazardous waste in an approved landfill. Liquid resulting from cleaning of equipment will be disposed of in the industrial wastewater treatment plant. All cleaning of equipment will be performed on the adjacent waste storage pad area which drains to the new industrial waste treatment system.

E. Post Closure

If the lagoon is decontaminated according to the above procedures pursuant to Texas Administrative Code Sections 335.286(a) and (b) and 335.456(c)(1), and federal regulations 40 CFR 265.228(a) and (b), post closure care would not be required.

F. Area Restoration

Following removal of the subsoil, the entire excavated area will be backfilled with clean soil. The new soil grade will be sloped to prevent accumulation of water on the site, and the area will be seeded to prevent erosion. Erosion control measures will be practiced during the closure activities.

G. Contingency

If the lagoon cannot be successfully decontaminated by the above procedures, it will be capped and deed recorded as a landfill in accordance with Texas Administrative Code Sections 335.4 and 335.5 and applicable regulations or a delisting petition will be submitted to the TDWR for delisting of the remaining subsoil.

IV. IMPLEMENTATION SCHEDULE FOR CLOSURE

The schedule presented below will be followed in implementing the procedures outlined in Section III of this plan. The dates shown are predicated on completion and successful compliance demonstration of the new pretreatment facility by September 28, 1985.

CLOSURE SCHEDULE

Task	Begin Date	Complete Date
Receive approval of the Closure Plan from the TDWR		7-01-85
Drain wastewater from the lagoon	9-03-85	9-06-85
Remove sludge from the lagoon	9-09-85	9-27-85
Remove concrete and excavate 1 foot of subsoil	9-22-85	10-11-85
Decontaminate sludge removal equipment	10-12-85	10-13-85
Collect and analyze additional subsoil samples	10-07-85	10-23-85
If necessary, remove and dispose of additional subsoil from the excavated area	10-24-85	11-08-85
If necessary, decontaminate subsoil removal equipment	11-09-85	11-10-85
Backfill excavated area and slope area	11-11-85	11-29-85
Closure certification	9-03-85	11-29-85

¹ May not be necessary

² Reseeding to be done in Spring, 1986

V. CLOSURE CERTIFICATION

To ensure that the closure of the facilities are completed as outlined in the closure plan, four (4) inspections of the operations by an Independent Registered Professional Engineer are anticipated.

The following qualifications, or certifications similar to these, will be completed following closure.

OWNER CERTIFICATION OF CLOSURE

I,	
(Owner or Oper	ator)
of General Motors Assembly Plant	, 2525 E. Abram Street,
Arlington, Texas, hereby state and	certify that, to the best
of my knowledge and belief, t	
equalization lagoon has been close	
facility's closure plan, and that	
the, 19,	
	- `
Signature	Date
Title	•

INDEPENDENT PROFESSIONAL ENGINEER CERTIFICATION OF CHOSURE

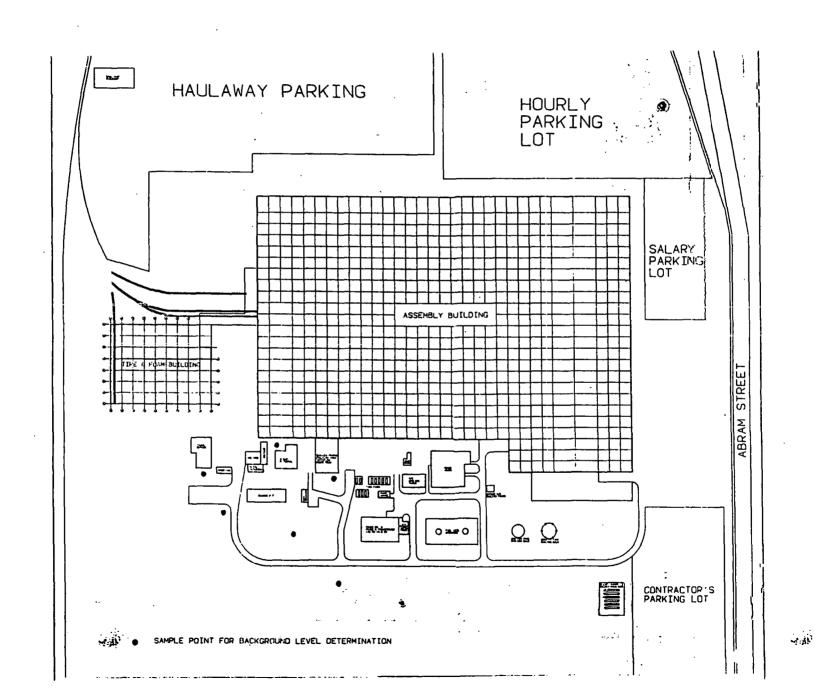
I,	,
(N	ame)
to the best of my knowledge a that Professional Engineer C for all prior closure acti Assembly Plant, Arlington, Te	xas; and that I have made visual tioned facility, and closure of equalization lagoon has been
Signature	Date
PE License Number	For State of
Business	s Address
•	
City/Stat	te/Zip Code
Pucinoss Molombor	on (With Area Code)

VI. CLOSURE COST ESTIMATE

A.	Pumping of wastewater (226,000 gals. @ \$.20/gal.)	\$ 45,200
В.	Removal and disposal of sludge (2,000 cu. yds. @ \$200/cu. yd.)	400,000
C.	Removal and disposal of concrete structure and one foot of subsoil (550 cu. yds. @ \$250/cu. yd.)	137,500
D.	Sampling and analysis of subsoil	
	<pre>1. Sampling costs 45 hrs. @ \$35/hr.</pre>	1,575
	2. Analysis costs 19 to 67 samples @ \$900/sample	17,100 - 60,300
	Sub-Total D	18,675 - 61,875
E.	Removal and disposal of additional subsoil, if any (\$200/cu. yd.)	1
F.	Decontamination of equipment	1,000
G.	Compacted backfill to grade and reseed (3,700 cu. yds. @ \$20/cu. yd.)	74,000 ²
н.	Professional certification	
	 Inspection and certification by a Professional Engineer (32 hrs. @ \$60/hr. 10 hrs. @ \$40/hr.) 	2,320
	2. Administrative costs (30 hrs. @ \$50/hr. 10 hrs. @ \$20/hr.)	1,700
	Sub-Total H	4,020
	TOTAL (A to H)	\$680,395-723,595

Total for subsoil removal can only be estimated when the soil analysis has been completed.

Does not include cost of additional backfill required as a result of additional subsoil removal.



314/337-0004

ALLIED ANALYTICAL & RESEARCH LABORATORIES



Chomists Consultants V Technologists

3031 Blomfield P.O. Boz 24330 Dallas, Toxas 75224

May 5, 1983

GM Assembly Division 2525 E. Abrams Street Arlington, TX 76010 Attn: Don Turnstall

A sample of waste material was submitted for profile analysis for disposal. The project number was 60848.

The methods of analysis employed were those described in the E.P.A. Manual Analysis of Water and Wastes, where applicable. Both wet chemical and intrumental methods were used.

In cases where the analysis involved the determination of a volatile element or compound, i.e. mercury, arsenic, etc., the analytical procedure was carried out on the original sample.

The solids were evaluated by emission spectrographic techniques to determine the approximate concentrations of all cations (metals) that were present. These elements were then quantitatively determined by atomic absorption spectroscopy or ICAP methods.

However, more sensitive and exacting techniques were employed where possible. For example, Mercury was determined on digested portions of the water and sludge, utilizing the flameless cold vapor system described by E.P.A. Determinations of arsenic, selenium, and antimony were accomplished by hydride generation of those elements from a special digestate into an entrained air-argon-hydrogen flame.

Organic contaminants were identified and quantitated using gas chromatography/mass spectrometry (GC/MS). Pesticide Scans were performed by GC/MS, using EPA protocol methodology.

H. Morris Weller President

Man Ille

ALLIED ANALYTICAL & REBEARCH LABORATORIES

3031 Glenfield P.O. Box 24830 Dallas, Texas 75224

Chemist's

214/337.4944

Consultant & Technologists
March 21, 1983

SAMPLE Liquid

DATE SUBMITTED 1/19/83

IDENTIFYING MARKS

See Below

ANALYTICAL REPORT NO. 60848



SUBMITTED BY

General Motors Assembly

2525 East Abrams Street Arlington, Texas 76010

ANALYSIS

Sample ID: 1 Liquid Sample

- A. Waste Characteristics:
 - 1) Phases/Layers: X None
 - 2) Physical State at 70°F: X Semi-Solid
 - 3) Solids: Total(%) 30.4 Total Dissolved (ppm or %) 1555 ppm
 - 4) Specific Weight (as # per unit): 1.665 gm/ml
 - 5) pH: 7.1 (Show the following as range of %)
 - 6) Flash Point greater than 212 OF (Closed Cup Test Only)
 - 7) Vapor Pressure (in mm of Hg at 25°C): water_vapor_
 - 8) BTU Per #: Doesn't Burn Ash Content 8.5
 - 9) Characteristic Color Black Distinctive Odor Oily
 - 10) Halogenated? no % Sulfonated? no
 - 11) Inorganic Components (with % ranges):

Total Cyanide

less than .02 ppm

Free Cyanide

NOT DETECTED.

Sulfide As:

1490 ppm

ALLIED ANALYTICAL & RESEARCH LASORATORIES

3031 Glenfield P.O. Box 24330 Dallas, Texas 75224

Chomists

214/337.4004

Consultants & Tochnologists

March 21, 1983

SAMPLE

Liquid

DATE SUBMITTED

1/19/83

IDENTIFYING MARKS

See Below

ANALYTICAL REPORT NO. 60848

Page 2

SUBMITTED BY

General Motors Assembly

2525 East Abrams Street Apparess Arlington, Texas 76010

EIEYJANA

B. Organic Components

COMPOUNDS	Approx. concentration milligrams/liter
Cyclohexane	1 - 10
Chloroform	1 - 10
Normal Paraffins, C ₈ -C ₁₃	2 - 20
Toluene	.2 - 2
Xylene	.2 - 2
Trimethylbenzenes	.2 - 2
Alkenes, C ₈ -C ₁₃	.2 2
Ethyl Xylenes	.2 - 2
Diethyl benzene	.2 - 2
Methyldecylbenzene	.2 - 2

ALLIED ANALYTICAL & RESEARCH LABORATORIES

3031 Glenfield

Bisamists.

214/337-8986

- P.O. Box 24330 Dallas, Fexas 75224

Consultants & Tochnologists March 21, 1983

SAMPLE

Liquid

DATE SUBMITTED 1/19/83

IDENTIFYING MARKS

See Below

ANALYTICAL REPORT NO.

Page 3

SUBMITTED BY

General Motors Assembly

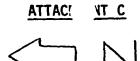
2525 East Abrams Street ADDRESS Arlington, Texas

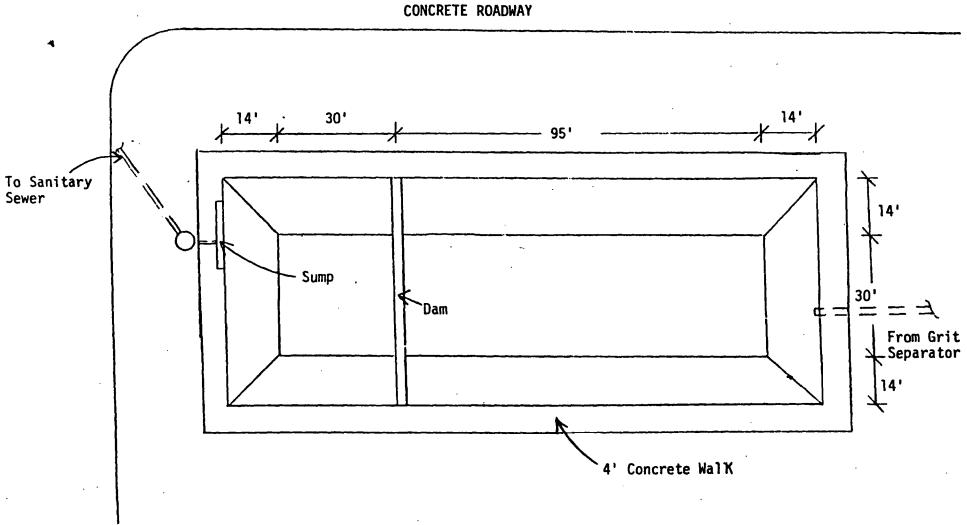
ANALYSIS

c.	Heavy Metals	Total milligr	Total Leachable * ams per liter
	Silver (Ag)	less than 0.05	less than 0.01
	Arsenic (As)	less than l	less than 0.005
	Barium (Ba)	855	0.05
	Cadmium (Cd)	1.57	less than 0.002
	Chromium (Cr)	933	less than 0.006
	Copper (Cu)	55.9	3.50
	Mercury (Hg)	less than 0.6	less than 0.04
	Nickel (Ni)	487	30.4
	Lead (Pb)	1260	less than 0.04
	Selenium (Se)	less than 1	less than 0.1
	Zinc (Zn)	2360	147.5
	Pesticides	NOT DETECT	ED

*EP Toxicity Data

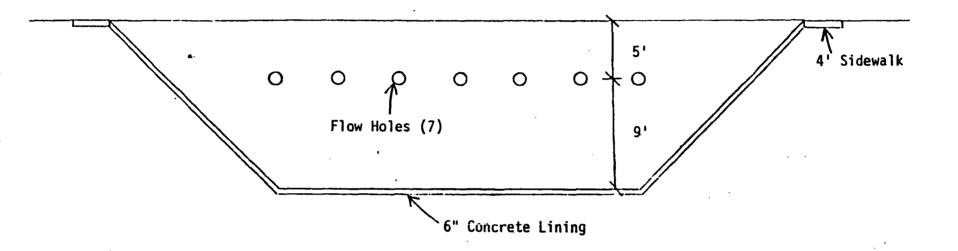
THIS REPORT DOES NOT CONSTITUTE APPROVAL OR AN ENDORSEMENT, ALL OR ANY UPTO IN ADVERTISING UNLESS AUTHORIZED BY THE DIRECTOR OF THE LASGRATORY.





CONCRETE LAGOON

Scale: 1" = 25'



ELEVATION

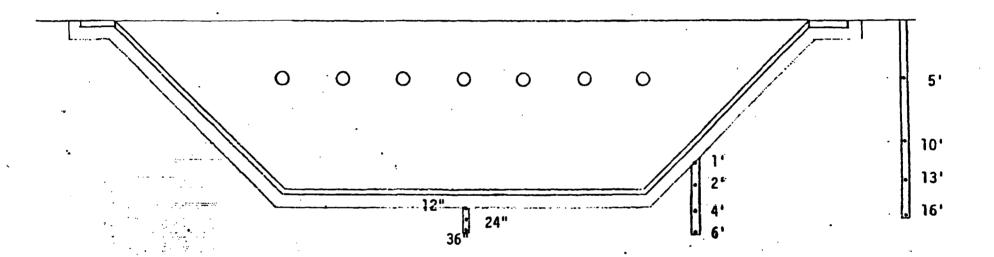
Scale: 1/8" = 1'-0"

ATTACHMENT D

SOIL SAMPLING LOCATIONS

Scale: 1" = 25'

ATTACHMENT E



SOIL SAMPLING DEPTHS (TYPICAL)

B. LAGOON CLOSURE SUMMARY

CLOSURE OF GENERAL MOTORS WASTEWATER EQUALIZATION LAGOON

I. SLUDGE REMOVAL

Lagoon wastewater was removed by pumping to the industrial wastewater pretreatment system. All lagoon wastewater was treated by the new pretreatment system prior to discharge to the City of Arlington, Texas sewer system. Wastewater removal was commenced on September 26, 1985 by CECOS/BFI.

After removal of the wastewater, CECOS/BFI began removal of sludge from the lagoon by pumping and dewatering of the sludge through a portable plate and frame filter press. Filtrate from the filter press was discharged to the industrial wastewater pretreatment system for treatment. Dewatered sludge (filter cake) was conveyed to a roll-off container and transported to a liscensed hazardous waste disposal facility operated by CECOS/BFI in Livingston, La. Hazardous wastes manifests were completed for each load and copies of the manifests were kept on file. Examples of the manifest are provided in Section E.

After removing approximately 600 cubic yards of dry filter cake from the lagoon, CECOS/BFI stopped work on October 19, 1985 due to a contract dispute with General Motors. CECOS/BFI decontaminated their equipment using high pressure water and moved off-site by October 22, 1985. All liquids used during decontamination were treated in the industrial wastewater pretreatment facility prior to discharge to the City of Arlington sewer system.

After reviewing alternatives for completion of sludge removal from the lagoon, General Motors contracted with Industrial Cleaning and Degreasing, Inc. to continue removal of the lagoon sludge. Lagoon sludge was pumped into a truck, transported to GM's on-site industrial wastewater treatment facility and pumped into a sludge thickening tank. The sludge was dewatered using the pretreatment plants plate and frame filter presses. Dewatered filter cake was placed into 20 cubic yard roll-off containers and hauled by Chemical Waste Management, Inc. to a liscensed hazardous waste disposal facility in Carlyss, La.

Industrial Cleaning and Degreasing decontaminated their equipment using high pressure water and moved off-site on November 27, 1985. All contaminated water was treated in the on-site industrial wastewater pretreatment facility prior to discharge to the City of Arlington sewer system.

The second phase of sludge removal was begun on November 11, 1985 and completed on November 27, 1985. Chemical Waste Management removed approximately 437 cubic yards of dry filter cake. After spray washing the concrete bottom and sidewalls of the lagoon, the resultant wastewater was pumped out and sent to the on-site industrial pretreatment system for treatment and disposal.

All contaminated soil and filter cake around the loading/unloading area at the lagoon were removed and disposed of with the filter cake by Chemical Waste Management. Hazardous waste manifests were completed for each load and copies of the manifest are on file. Examples of Chemical Waste Management's manifest are also provided in Section E.

II. SOIL INVESTIGATIONS

Background soil samples were obtained at six locations by Southwestern Laboratories, Inc. as directed in the closure plan. The six samples were composited in equal parts by the laboratory to form one background sample. A summary of sampling and analysis procedures utilized by Southwestern Lab's as well as results of the laboratory analyses are presented in Section D.

Review of EP-Toxicity analytical results from the composite background sample indicated chromium and lead concentrations exceeding maximum allowable contaminant levels. Subsequent reexamination of the remaining portions of the background samples did not identify the source of the metals. Review of the laboratories QC/QA data also did not reveal a laboratory error. As indicated in the laboratory report in Section D, the most likely explanation is a localized area of possible contamination in the background samples.

Since each of the individual background sample analyses were "clean", the average of these background samples was used to compare against the lagoon soil sample results.

Soil samples were obtained from the lagoon as directed by the closure plan. In order to avoid potential delays, additional soil samples were obtained from areas of potential contamination (at cracks in concrete, etc) at depths greater than that specified in the closure plan. A description of these samples, as well as the sampling and analysis procedures used and analytical results obtained, are presented in Section D.

Results of the lagoon soil analyses reveals that the soil beneath the lagoon is virtually free from levels of pollutants greater than 10 times background. Exceptions to this included two occurances of zinc at 0.56 mg/l and 0.36 mg/l, respectively. Subsequent analyses of the next lower level of the affected soils revealed that no pollutants were detected at levels greater than 10 times average background.

As indicated in the laboratory report, polychlorinated biphenyls (PCB's) were found in one (1) of the lagoon samples at a concentration of 3 ppm. However, PCB's were not found in any other sample analyzed and therefore, was an isolated occurance.

As shown in the laboratory report in Section D, pH's were measured for each soil sample. The range of pH's encountered in the lagoon soil were between 6.3 and 7.4. Tests for reactivity and ignitability were performed on samples LI-7 and 8 at Level 1. Results of these tests indicated that none of the lagoon soil samples were ignitable, corrosive or reactive as identified in Federal Regulation 40 CFR 261.

Based upon the above results, the lagoon soil was deemed to be free of contamination as defined in the closure plan and the lagoon closure was allowed to proceed according to plan.

III. CONCRETE AND SOIL REMOVAL

Rollins Environmental Services, Inc. began removal of the concrete liner on December 2, 1985. Rollins broke up the concrete in-place and hauled it to an approved hazardous waste disposal facility for final disposal. A hazardous waste manifest was maintained and copies have been retained on file. An example of a Rollins manifest ticket is shown in Section E.

After the concrete had been removed, additional subsoil was removed from the former lagoon site in accordance with the closure plan. This soil was hauled off-site and disposed of at the same hazardous waste facility as the concrete. A total of approximately 1,016 cubic yards of concrete and dirt were disposed of.

Rollins decontaminated their equipment using high pressure water. All contaminated water was treated in the on-site industrial wastewater pretreatment facility prior to discharge to the City of Arlington sewer system.

IV. AREA RESTORATION

Following removal of the subsoil, the entire excavated area was backfilled with clean, compacted soil. The new soil grade was sloped to prevent accumulation of water on the site, 4 inches of top soil was added, and the area was seeded with rye-grass to prevent erosion.

Restoration work was completed by Rollins on December 20, 1985.

V. PROJECT RECORDS

Copies of field notes, photographs and hazardous waste manifest sheets are permanently on file at General Motors and are available upon request.

C. LAGOON CLOSURE CERTIFICATION

INDEPENDENT PROFESSIONAL ENGINEER CERTIFICATION OF CHOSURE

I, Thomas R. Caldwell,	P.E
	(Name)
a Registered Professional Er	ngineer, hereby state and certify,
to the best of my knowledge	and belief, that I have verified Closure Certificates were issued
	tivities at the General Motors
	Cexas; and that I have made visual
	entioned facility, and closure of
the industrial wastewater	equalization lagoon has been
performed in accordance with	the approved closure plan.
\mathcal{A}	
Thomas R. Caldwell Signature	1/6/85
Signature \	Date
52791	Texas
PE License Number	For State of
•	
12700 Hillcrest Road, Suite	125
Busine	ss Address
	•
Dallas, Texas 75230	
	ate/Zip Code
CICY/SC	ate/aip code
(014) 000 0001	•
(214) 980-0001	
Business Teleph	one (With Area Code)



D. LABORATORY REPORT

SOUTHWESTERN LABORATORIES

ENVIRONMENTAL SOIL SAMPLING AND ANALYSIS

TRADE WASTE LAGOON CLOSURE, ARLINGTON PLANT

ARLINGTON, TEXAS

Prepared For
General Motors Corporation
GM Assembly Division, Arlington Plant
Arlington, Texas

January 7, 1986 SwL Report No. 85-1468-1 (REV.)

SOUTHWESTERN LABORATORIES



SOUTHWESTERN LABORATORIES

North Texas Region Geotechnical Division



Materials, environmental and geotechnical engineering, nondestructive, metallurgical and analytical services

2575 Lone Star Drive • P.O. Box 224227 • Dallas, Texas 75264 • 214/263-1133

January 7, 1986

General Motors Corporation GM Assembly Division, Arlington Plant Engineering Department 2525 East Abram Street Arlington, Texas 76011

Attention: Mr. Kent Moon

Re: Environmental Soil Sampling & Analysis
Trade Waste Lagoon Closure, Arlington Plant
Arlington, Texas
SwL Report No. 85-1468-1 (REV.)

Gentlemen:

Submitted herewith are our results of soil sample analyses for the referenced project. This work was performed in accordance with our proposal of August 26, 1985 and GM Purchase Order No. AR41748, dated September 11, 1985.

An Interim Report with results from the tested background and exterior boring samples was previously submitted on October 25, 1985. This report contains results from the Interim Report along with the additional results from our recently completed tests on the interior boring samples.

Field sampling methods, Boring Location Diagrams, and Boring Logs are included in Appendix A. Laboratory test procedures and results are included in Appendix B along with related supporting information.

SOUTHWESTERN LABORATORIES

General Motors Corporation Mr. Kent Moon Page two January 7, 1986

It has been a pleasure to perform this work for you. If you have any questions about information in this report or if we can be of further assistance, please do not hesitate to contact us.

Sincerely,

SOUTHWESTERN LABORATORIES, INC.

Trene C. Hadley
Analytical Services

Bruce Bailey, Ph.D., P.E.

Geotechnical Engineering Division

ICH/BB/bkf

3CC: HDR Environmental Technologies

APPENDIX A

APPENDIX A: FIELD SAMPLING

Field Sampling Methods

The soil samples from the lagoon area were obtained from soil borings designated as follows:

B - Background

LE - Lagoon Exterior

LI - Lagoon Interior

The background and exterior borings were drilled using a truck mounted, auger rig on September 16, 1985, prior to final lagoon cleanout and demolition. The interior borings were drilled during the initial stages of the liner demolition activities using a hand power auger to advance the borings on December 3 and 4, 1985. The interior borings were drilled through holes broken through the concrete liner. The bottom interior borings (Borings LI-7, LI-8, and LI-9) were filled with grout after completion.

The boring locations are shown in the Boring Location Diagrams in accordance with the Lagoon Closure Plan. All borings were drilled and samples obtained under the direct supervision of our Field Geologist.

SOUTHWESTERN LABORATORIES

The samples were obtained using new, 2-inch diameter Shelby tube soil samplers, 24 inches in length, which had been cleaned in the laboratory with acetone and tap water. In the field, the samplers were again cleaned using high pressure water and steam before use. In addition, the drilling augers were similarly cleaned with high pressure water and steam between borings.

After the samples were obtained from the borings, they were sealed in foil, identified and stored on ice for transporting to the laboratory.

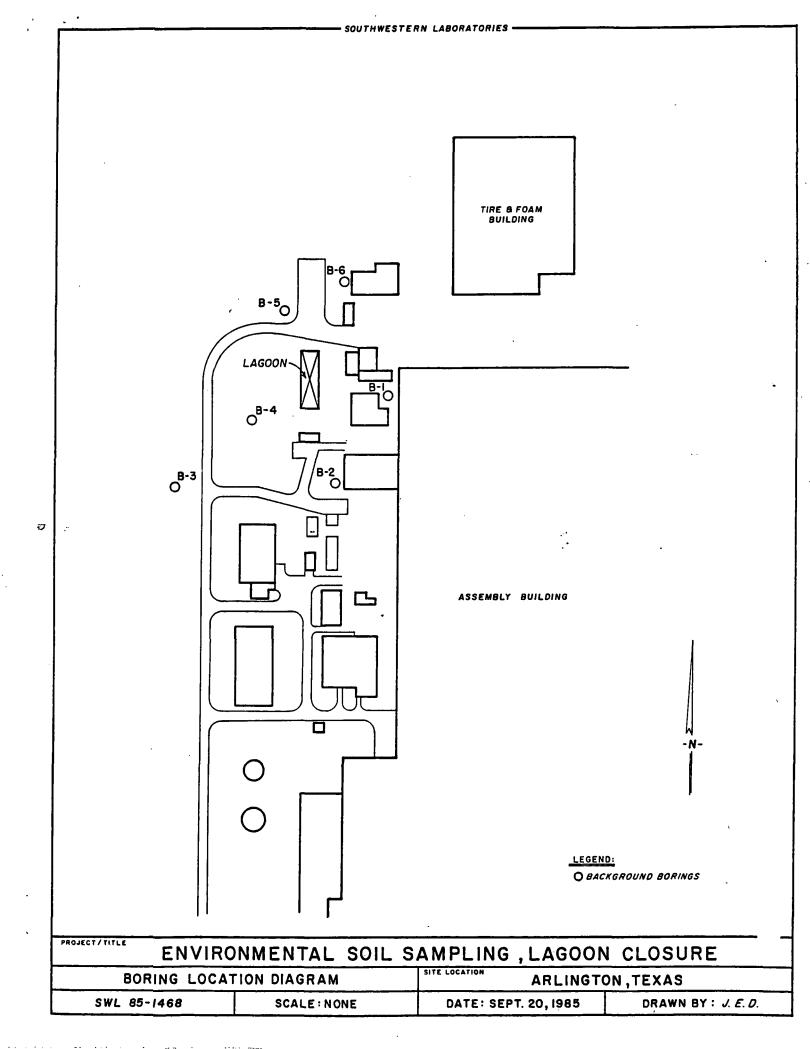
The background samples were obtained from shallow depths of 2.5 to 4.5 feet. Samples were obtained from four depths in the exterior (LE) borings, identified as follows:

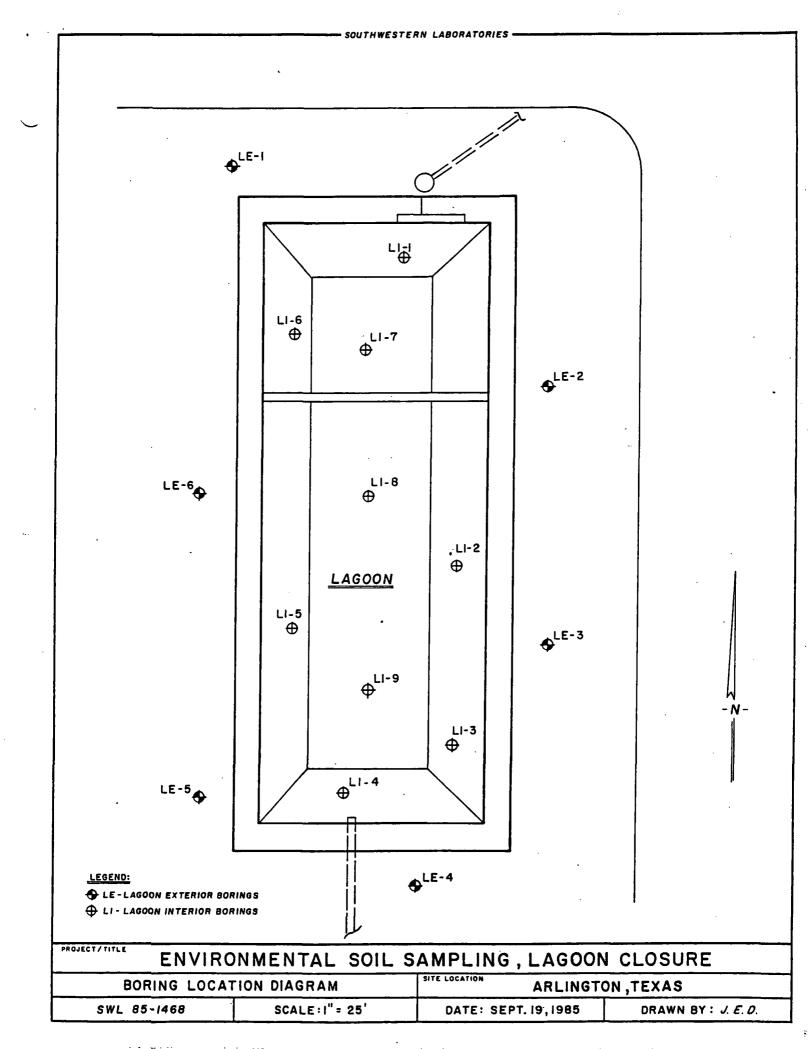
Designation	Nominal Depth, feet
Level 1	5
Level 2	10
Level 3	13
Level 4	16

Samples were also obtained from four depths (below the concrete liner surface) in the interior (LI) borings, identified as follows:

Designation	Nominal Depth, feet
Level 1	2.1
Level 2	3.1
Level 3	5.0
Level 4	6.8

Soil stratigr	aphy, based on	visual iden	Soil stratigraphy, based on visual identification of soils found in					
the borings, also is included on the Boring Logs in this Appendix.								
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LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: B-1 LOCATION: Arlington, Texas CLIENT: General Motors Corporation, Arlington Plant 9-16-85 DATE: TYPE: Auger **GROUND ELEVATION:** CASED TO: STANDARD PENETRATION BLOWS/f1. WATER INFORMATION ls f. LEGEND: Dry at completion SAMPLE SYMBOL HAND PEN. STANDARD PENETRATION WATER DESCRIPTION OF STRATUM 6" Concrete - Tan sand Tan and shaley brown sandy clay with tannish shaley clay 2 Bottom of Hole at 3' 6 8 10 12 14 16 18-- 20-22-24 26

LOG OF BORING PROJECT:Environmental Soil Sampling, Lagoon Closure BORING NO.: B-2 CLIENT: General Motors Corporation, Arlington Plant LOCATION: Arlington, Texas GROUND ELEVATION: DATE: TYPE: CASED TO: Auger 9-16-85 WATER INFORMATION STANDARD PENETRATION BLOWS/ft. LEGEND: ts f SAMPLE Dry at completion SYMBOL HAND PEN. STANDARD PENETRATION WATER DESCRIPTION OF STRATUM Tan and tannish gray shaley clay with silty seams 2 -Bottom of Hole at 2.5' 4 6 8 -- 10 -12 14 · 16 · 18 20-22-24 26

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: B-3 LOCATION: Arlington, Texas General Motors Corporation, Arlington Plant CLIENT: 9-16-85 TYPE: Auger DATE: CASED TO: **GROUND ELEVATION:** STANDARD PENETRATION BLOWS/ft. WATER INFORMATION LEGEND: ts f SAMPLE SYMBOL HAND PEN. Dry at completion STANDARD PENETRATION WATER DESCRIPTION OF STRATUM Tan sand 2 Brown clay with lime pebbles Bottom of Hole at 2.5' 4 6 8 10 · 12 · - 14 16 18 20 22-24 26

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: B-4 CLIENT: General Motors Corporation, Arlington Plant LOCATION: Arlington, Texas DATE: 9-16-85 TYPE: Auger CASED TO: **GROUND ELEVATION:** WATER INFORMATION STANDARD PENETRATION BLOWS/ft. LEGEND: HAND PEN. 1sf DEPTH IN FEET Dry at completion SAMPLE SYMBOL STANDARD PENETRATION WATER DESCRIPTION OF STRATUM Brown sandy clay with tree root seams 2 Tannish brown silty clay with lime seams and lime pebbles 4 Bottom of Hole at 4.5' 6 8 -- 10 -- 12 -14 - 16 -- 18-20-22-24 26

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: B-5 General Motors Corporation, Arlington Plant CLIENT: LOCATION: Arlington, Texas 9-16-85 TYPE: Auger DATE: **GROUND ELEVATION:** CASED TO: STANDARD PENETRATION BLOWS/ft. WATER INFORMATION LEGEND: tsf SAMPLE SYMBOL HAND PEN. Dry at completion STANDARD PENETRATION WATER DESCRIPTION OF STRATUM Tan sand 2 Tan and brown sandy clays - fine Bottom of Hole at 2.5' 4 6 8 -- 10 -12 -14 - 16 -18 20 - 22-24 26

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: B-6 CLIENT: LOCATION: Arlington, Texas General Motors Corporation, Arlington Plant DATE: 9-16-85 TYPE: Auger GROUND ELEVATION: CASED TO: STANDARD PENETRATION BLOWS/ft. WATER INFORMATION LEGEND: tsf. DEPTH IN FEET Dry at completion SAMPLE SYMBOL HAND PEN. STANDARD PENETRATION WATER DESCRIPTION OF STRATUM Tan sand with gravel (fill) 2 . Brown clay Tan limy clay with lime seams and pebbles 4 Bottom of Hole at 4' 6 8 - 10 -12 -14 16 -18 20-22-24 26

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Glosure BORING NO.: LE-1 LOCATION: Arlington, Texas General Motors Corporation, Arlington Plant 9-16-85 DATE: TYPE: Auger **GROUND ELEVATION:** CASED TO: STANDARD PENETRATION BLOWS/ft. WATER INFORMATION LEGEND: HAND PEN. 1sf. SAMPLE SYMBOL Dry at completion STANDARD PENETRATION WATER DESCRIPTION OF STRATUM Broken clays with roots and rocks (fill) 2 . 4 6 Tan and gray shaley clay with rust and silt seams 8 -- 10 -12 - 14 16 Bottom of Hole at 16.5' 18 20 22 24

LOG OF BORING LE-2 PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: General Motors Corporation, Arlington Plant LOCATION: Arlington, Texas CLIENT: 9-16-85 Auger DATE: TYPE: CASED TO: **GROUND ELEVATION:** STANDARD PENETRATION BLOWS/ft. WATER INFORMATION tsf. LEGEND: DEPTH IN FEET SAMPLE Dry at completion HAND PEN. STANDARD PENETRATION WATER DESCRIPTION OF STRATUM Tan sand 2 -Tannish and gray shaley clay with silt seams 4 6 -8 10 12 -14 16 Bottom of Hole at 16.5' - 18 20 22 24

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: LE-3 General Motors Corporation, Arlington Plant LOCATION: Arlington, Texas CLIENT: 9-16-85 Auger DATE: TYPE: **GROUND ELEVATION:** CASED TO: STANDARD PENETRATION BLOWS/ft. WATER INFORMATION LEGEND: ts DEPTH IN FEET SAMPLE HAND PEN. SYMBOL SAMPLE Dry at completion STANDARD PENETRATION WATER DESCRIPTION OF STRATUM Brown clays and tan sands 2 Tan and tannish brown and gray shaley clay with silty seams 6 8 10 12 - 14 16 Bottom of Hole at 16.5' - 18 -- 20-- 22-24

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: LE-4 CLIENT: LOCATION: Arlington, Texas General Motors Corporation, Arlington Plant DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION: STANDARD PENETRATION BLOWS/ft. WATER INFORMATION ls f LEGEND: DEPTH IN FEET SAMPLE SYMBOL SAMPLE HAND PEN. Dry at completion STANDARD PENETRATION WATER DESCRIPTION OF STRATUM Brown and tan clays with wire fence and boards (fill) 2 Tan and tannish brown and gray shaley clay with silt seams 6 -- 10 12 -14 - 16 Bottom of Hole at 17' - 18 -20-22-

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: L E-5 LOCATION: Arlington, Texas General Motors Corporation, Arlington Plant CLIENT: 9-16-85 TYPE: Auger DATE: CASED TO: **GROUND ELEVATION:** STANDARD PENETRATION BLOWS/ft. WATER INFORMATION LEGEND: HAND PEN. 1sf Dry at completion SAMPLE SYMBOL SAMPLE STANDARD PENETRATION WATER DESCRIPTION OF STRATUM Brown clays (jointed) with roots and rocks (fill) 2 4 Tan and gray shaley clay with rust and silt seams 6 8 - 10 12 - 14 16 Bottom of Hole at 16.5' 18 -20-22 24

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: LE-6 LOCATION: Arlington, Texas General Motors Corporation, Arlington Plant CLIENT: 9-16-85 TYPE: Auger DATE: CASED TO: **GROUND ELEVATION:** WATER INFORMATION STANDARD PENETRATION BLOWS/ft. LEGEND: ž. DEPTH IN FEET SAMPLE PEN Dry at completion SYMBOL STANDARD PENETRATION WATER HAND I DESCRIPTION OF STRATUM Jointed clays (fill) 2 Tan and grayish shaley clay with rust and silt seams 6 8 10 12 14 16 Bottom of Hole at 16.5' 18 20-22-24 26

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: LI-1 LOCATION: Arlington, Texas CLIENT: General Motors Corporation. 12/3/85 TYPE:Hand Power Auger CASED TO: DATE: **GROUND ELEVATION:** STANDARD PENETRATION BLOWS/ft. WATER INFORMATION HAND PEN. 1sf. LEGEND: DEPTH IN FEET SAMPLE SYMBOL Water noted at 6' STANDARD PENETRATION WATER DESCRIPTION OF STRATUM 4" Concrete Tan and gray shaley silty clay 2 4 6 8 Bottom of boring at 7.5 - 10 - 12 - 14 16 18 20 22 24 26

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: LI-2 CLIENT: General Motors Corporation LOCATION: Arlington, Texas TYPE:Hand Power Auger CASED TO: DATE: 12/3/85 GROUND ELEVATION: STANDARD PENETRATION BLOWS/ft. WATER INFORMATION ts f LEGEND: 1 SAMPLE SAMPLE SYMBOL HAND PEN. STANDARD PENETRATION No seepage noted WATER DESCRIPTION OF STRATUM 10" Concrete 2 . Tan and gray shaley clay 6 8 Bottom of boring at 7.5' - 10 - 12 - 14 16 - 18-- 20 22--24 26

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: LI-3 General Motors Corporation CLIENT: LOCATION: Arlington, Texas TYPE Hand Power Auger CASED TO: 12/3/85 DATE: **GROUND ELEVATION:** STANDARD PENETRATION BLOWS/ft. WATER INFORMATION ts f. LEGEND: DEPTH IN FEET SAMPLE SYMBOL HAND PEN. STANDARD PENETRATION WATER DESCRIPTION OF STRATUM 9.5" Concrete 2 Tan and gray shaley silty clay 4 6 8 -Bottom of boring at 7.5' 10 - 12 -- 14 16 -- 18 -20-22-24

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: LI-4 General Motors Corporation LOCATION: Arlington, Texas CLIENT: DATE: 12/3/85 Typeland Power Auger CASED TO: **GROUND ELEVATION:** WATER INFORMATION tsf. STANDARD PENETRATION BLOWS/ft. LEGEND: DEPTH IN FEET SAMPLE SYMBOL HAND PEN. STANDARD PENETRATION WATER DESCRIPTION OF STRATUM 10" Concrete 2 . Tan and tannish brown shaley silty clay 4 6 8 -Bottom of boring at 7.5' - 10 12 - 14 -16 18 -20-22-24 26

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: LI-5 LOCATION: Arlington, Texas CLIENT: General Motors Corporation 12/3/85 DATE: TYPE: Hand Power Auger CASED TO: GROUND ELEVATION: STANDARD PENETRATION BLOWS/ft WATER INFORMATION LEGEND: HAND PEN. 1sf. Z_L SAMPLE SYMBOL DEPTH I FEET STANDARD PENETRATION No seepage noted WATER DESCRIPTION OF STRATUM 10" Concrete 2 Tan and gray shaley clay 4 -noted bentonite seam at 4' 6 8 -Bottom of boring at 7.5' 10 12 - 14 16 18 - 20 22 -24

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.:LI-6 CLIENT: General Motors Corporation LOCATION: Arlington, Texas TYPE: Hand Power Auger CASED TO: 12/3/85 DATE: **GROUND ELEVATION:** STANDARD PENETRATION BLOWS/ft. WATER INFORMATION tsf. LEGEND: DEPTH IN FEET SAMPLE SYMBOL PEN STANDARD PENETRATION HAND F WATER DESCRIPTION OF STRATUM 10" Concrete 2 Tan and gray shaley clay with bentonite seams 6 -- a --Bottom of boring at 7.5' - 10 · 12 · - 14 16 -18 20-22-24 26

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: LI-7 CLIENT: General Motors Corporation LOCATION: Arlington, Texas 12/3/85 TYPE: Hand Power Auger CASED TO: DATE: GROUND ELEVATION: STANDARD PENETRATION BLOWS/ft. WATER INFORMATION HAND PEN. 1sf. LEGEND: SAMPLE SYMBOL Noted seepage at 1' STANDARD PENETRATION WATER DESCRIPTION OF STRATUM 10" Concrete 2 -Tan and gray shaley clay 4 6 -8 -Bottom of boring at 7.5' - 10 -12 -14 16 -18 - 20 - 22-24

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: LI-8 CLIENT: General Motors Corporation LOCATION: Arlington, Texas TYPE:Hand Power Auger CASED TO: 12/3/85 DATE: **GROUND ELEVATION:** STANDARD PENETRATION BLOWS/ft. WATER INFORMATION LEGEND: ts f. DEPTH IN FEET SAMPLE HAND PEN. SYMBOL STANDARD PENETRATION Seepage noted at 1' DESCRIPTION OF STRATUM 10" Concrete 2 . Tan and gray shaley clay 4 6 8 -Bottom of boring at 7.5' 10 - 12 -- 14 -16 -- 18 -20-22--24

26

LOG OF BORING PROJECT: Environmental Soil Sampling, Lagoon Closure BORING NO.: LI-9 LOCATION: Arlington, Texas CLIENT: General Motors Corporation 12/3/85 DATE: TYPE:Hand Power Auger CASED TO: GROUND ELEVATION: STANDARD PENETRATION BLOWS/ft. WATER INFORMATION LEGEND: HAND PEN. 1sf. DEPTH IN FEET SAMPLE SYMBOL STANDARD PENETRATION Seepage noted at 1' WATER DESCRIPTION OF STRATUM 10" Concrete 2 Tan and gray shaley clay 6 -8 -Bottom of boring at 7.5' 10 -- 12 -14 16 -18-20 22 24

APPENDIX B

APPENDIX B: LABORATORY ANALYSES, PROCEDURES AND RESULTS

In the laboratory, the samples were stored in the freezer for subsequent testing. Samples selected for testing were extruded under the direct supervision of a Chemist and the ends and exterior of the samples were trimmed to obtain test specimens of approximately 400 grams from near the center of the samples. Untested samples and the remaining portions of tested samples have been retained in freezer storage.

The tests were performed in accordance with the project parameter list developed by the client included in Table 1.

The following test procedures were used in these analyses:

Inorganic Sample Test Procedures:

Soils to be tested for EP Tox Metals were extracted according to EPA SW-846 Method 1310. The metals were analyzed using the following EPA SW-846 Method Numbers: 7060, 7080, 7130, 7190, 7421, 7470, 7520, 7740, 7760, 7950.

Organic Sample Test Procedures:

Pesticides and Herbicides:

Soil was extracted according to EPA SW-846 Method 1310 (EP Toxicity Extraction). Analysis was carried out by Gas Chromatography using electron detection, and utilizing capillary columns.

Table 1: Project Parameter List

Arsenic Barium Cadmium Chromium Lead Selenium Silver Nickel Zinc Mercury Endrin · Lindane Methoxychlor Toxaphene 2,4-D 2,4,5-TP Silvex Benzene Xylene Bis-2Ethyl Hexyl Phthalate ButylBenzalPhthalate Carbon Tetrachloride Cis-1,3-dichloropropylene Cyclohexane Diethyl Phthalate Di-n-butyl Phthalate Di-n-octyl phthalate Ethyl Benzene Methylene Chloride Napthalene 1,1,2-Trichloroethane pН

Volatile Organics and Phthalate Esters:

Soils were extracted by a method similar to EPA SW-846 Method 5020. The soil was mixed with 10% Sodium Sulfate. 1ml Iso-octane was added to this mixture. Chlorobenzene was used as an internal standard. The mixture was then heated so as to force the volatile organics from the soil into the Iso-octane. 1ml of the Iso-octane sample was injected into a Gas Chromatograph fitted with capillary columns. Flame Ionization Detection was utilized for Aromatic Volatile Organics. Electron Capture Detection was utilized for Chlorinated Volatile Organics and Phthalate Esters.

The test results are summarized in six reports (Reports 1 through 6) in the following pages.

Report 1 includes the project parameter list results for a composite background sample (composited using equal parts by weight from each location) and for the Level 1 samples from the exterior borings (LE borings). Several high readings, notably chromium and lead, were found in the composite background sample. As a result of this finding and to determine which of the samples contained these higher contaminant levels, additional selected tests were performed on the individual background samples as included in Report 2. These test results did not indicate the higher contaminant levels and this difference in findings is attributed to different findings for different segments of the individual soil samples It was concluded that the composite sample contained a limited contaminated soil zone which was localized and did not appear again in the sample segments tested and included in Report 2.

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The bottom samples in the LE-borings (Level 4) were also analyzed for the project parameter list. These results are also included in Report 2.

Report 3 includes results of a PCB finding that appeared during the Gas Chromatograph analysis on the sample from Level 4 in Boring LE
1. PCB's were not detected in the remaining samples.

Report 4 contains the results for the project list parameters for Level

1 in the interior borings (LI borings).

Results of project list parameter tests for selected samples from greater depths in interior Borings LI-4 and LI-7 and from intermediate depths in exterior Boring LE-2 are included in Report 2.

Report 6 includes results of ignitability and reactivity characteristic tests for one selected sample.

Following these reports are a discussion of our in-house QA/QC Program and copies of our laboratory worksheets for blank, spike and duplicate sample tests.



Construction materials testing, analytical chemistry and geotechnical engineering P.O. Box 224227 • 2575 Lone Star Orive • Dallas, Texas 75264 • 214/631-2700

1/6/86 -issued Report

January 6, 1986

File No. Report 1

Report of:

Analysis of Soil

Reported to:

Southwestern Laboratories-Geotechnical Division

Attn: Bruce Bailey

Date received:

9/17/85

Identification:

Trade Waste Lagoon Closure; GM Arlington Plant

Level 1 (5' Depth in LE Borings)

reset 1 (2, nebturn r	E DULINGS)			
	Background Composite	<u>LE-1</u>	<u>LE-2</u>	<u>LE-3</u>
Arsenic (ppm)	1.7	*.1	*.1	*.1
Barium (ppm)	.2	1.7	.4	. 4
Cadmium (ppm)	. 23	.01	.02	.01
Chromium (ppm	26.3	*.05	*.05	*.05
Lead (ppm)	16.3	*.01	*.01	. 20
Selenium (ppm)	*.1	*.1	*.1	*.1
Silver (ppm)	*.01	*.01	*.01	.13
Nickel (ppm)	.85	.08	*.05	.14
Zinc (ppm)	2.74	.14	*.01	*.01
Mercury (ppm)	*.05	*.05	*.05	*.05
Endrin (ppb)	*.2	*.2	*.2	*.2
Lindane (ppb)	*.4	*.4	*.4	*.4
Methoxychlor (ppm)	*.1	*.1	*.1	*.1
Toxaphene (ppb)	*.5	*.5	*.5	*.5
2,4-D (ppm)	*.1	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*0.1	*.01	*.01	*.01
Benzene (ppm)	*.5	. *. 5	*.5	*.5
Xylene (ppm)	*.1	*.1	*.1	*.1
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01	*.01
Cis-1,3-dichloropropylene (ppm)	*.1	*.1	*.1	*.1
Cyclohexane (ppm)	*.1	*.1	*.1	*.l
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.I	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*.1	*.1
Naphthalene (ppm)	*.1	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01	*.01
рĤ	7	7.4	7.7	7.5

* None detected, less than

Distribution of report:

3c-Southwestern Laboratories/Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley

Assistant Manager, Analytical Servic

Lab. No.D-23758-1 /cdr



1/6/86
Re-issued Report

Construction materials testing, analytical chemistry and geotechnical engineering P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

January 6, 1986

File No. Report 1

Report of:

Analysis of Soil

Reported to:

Southwestern Laboratories-Geotechnical Division

Attn: Bruce Bailey

Date received:

9/17/85

Identification:

Trade Waste Lagoon Closure; GM Arlington Plant

Level 1 (5' Depth in LE Borings)

	<u>LE-4</u>	<u>LE-5</u>	<u>LE-6</u>
Arsenic (ppm)	*.1	.2	*.1
Barium (ppm)	.5	1.7	*.1
Cadmium (ppm)	*.01	*.01	*.01
Chromium (ppm	*.05	*.05	*.05
Lead (ppm)	*.1	*.1	*.1
Selenium (ppm)	.2	.3	*.1
River (ppm)	*.01	.03	.01
Nickel (ppm)	.12	*.05	*.05
Zinc (ppm)	*.01	.53	*.01
Mercury (ppm)	*.05	*.05	*.05
Endrin (ppb)	*.2	*, 2	*.2
Lindane (ppb)	*.4	*.4	*.4
Methoxychlor (ppm)	*.1	*.1	*.1
Toxaphene (ppb)	*.5	*. 5	*.5
2,4-D (ppm)	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*.01	*.01	*.01
Benzene (ppm)	*.5	*.5	*.5
Xylene (ppm)	*.1	*.1	*.1
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01
Cis-1,3-dichloropropylene (ppm)	*.1	*.1 ,	*.1
Cyclohexane (ppm)	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*.1
Naphthalene (ppm)	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01
pH	7.5	7.5	7.8
4.37			

* None detected, less than

Distribution of report:

3c-Southwestern Laboratories/Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

er: Trene C. Hadl

Assistant Manager, Analytical Service

002 Lab. No. D-23758-2 /cdr



1/6/86 Re-issued Report Construction materials testing, analytical chemistry and geotechnical engineering P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

January 6, 1986 File No. Report 2

Report of:

Analysis of Soil

Reported to:

Southwestern Laboratories-Geotechnical Division

Attn: Bruce Bailey

Date received:

9/17/85

Identification:

Trade Waste Lagoon Closure

Background

-	<u>B-1</u>	<u>B-2</u>	<u>B-3</u>	<u>B-4</u>	<u>B-5</u>	<u>B-6</u>
Arsenic (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Barium (ppm)	3.0	1.2	*.1	.1	1.1	1.0
Cadmium (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
Chromium (ppm)	*.05	*.05	*.05	*.05	*.05	*.05
Lead (ppm)	*.1	*.1	*.1	*.1	.3	*.1
Nickel (ppm)	.14	.20	*.05	*-05	.06	.09
Zinc (ppm)	.04	.01	*.01	*.01	.02	.03
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.i	*.1	·*.I	*.1	*.1
ButylBenzalphthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Di-n-octyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
рН	7.5	7.4	7.0	6.9	7.2	7.1

^{*} None detected, less than

Distribution of report:

3c-Southwestern Laboratories-Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley

Assistant Manager, Analytical Service:

002 Lah. No. D-23985-1 /cdr



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1/6/86 Re-issued Report

January 6, 1986 File No. Report 2

Report of:

Analysis of Soil

Reported to:

Southwestern Laboratories-Geotechnical Division

Attn: Bruce Bailey

Date received:

9/17/85

Identification:

Trade Waste Lagoon Closure

Level 4 (16' Depth in LE Borings)

•	LE-1	LE-2	<u>LE-3</u>	<u>LE-4</u>	<u>LE-5</u>	<u>LE-6</u>
Arsenic (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Barium (ppm)	.8	.2	. *.1	.6	2.1	. 4
Cadmium (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
Chromium (ppm	*.05	*.05	*.05	*.05	*.05	*.05
Lead (ppm)	*.1	.1	*.1	.1	. 2	. 2
Selenium (ppm)	.1	*.1	*.1	.2	.2	. 2
Silver (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
Nickel (ppm)	*.05	*.05	*.05	.09	*.05	*.05
Zinc (ppm)	*.01	*.01	*.01	*.01	.11	.01
Mercury (ppm)	*.05	*.05	*.05	*.05	*.05	*.05 -
Endrin (ppb)	*.2	*.2	*.2	* 、2	*.2	*.2
Lindane (ppb)	. *.4	*.4	*.4	*.4	*.4	*.4
Methoxychlor (ppm)	*.1	*.1	*.1	* *.1	*.1	*.1
Эжарhene (ppb)	*.5	*.5	*.5	*.5	*.5	*.5
2-D (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
Benzene (ppm)	*.5	*.5	*.5	*.5	*.5	*.5
Xylene (ppm)	*.1	*.1	*.1	· *.1	*.1	*.1
Bis-2Ethyl Hexyl Phthalate (ppm)	*.l	*.1	*.1	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
Cis-1,3-dichloropropylene (ppm)	*.I	*.1	*.1	*.1	*.1	*.I
Cyclohexane (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Naphthalene (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
pH	7.3	7.3	7.2	7.1	7.4	7.3

* None detected, less than

Distribution of report:

3c-Southwestern Laboratories/Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley

Assistant Manager, Analytical Service

002 Lab. No.D-23985-2 /cdr

SWL

Southwestern Laboratories, inc.

Construction materials testing, analytical chemistry and geotechnical engineering P.O. Box 224227 • 2575 Lone Star Drive • Dalles, Texas 75264 • 214/631-2700

October 24, 1985 File No. Report 3

Report of:

Analysis of Soil

Reported to:

Southwestern Laboratories, Inc.

Attn: Mr. Bruce Bailey

Date received:

9-17-85

Identification:

Trade Waste Lagoon Closure; Level 16', LE-1

Gas Chromatograph analysis of this sample indicated the presence of polychlorinated biphenyl (PCB). Subsequently, the sample was extracted and specifically analyzed for PCB content. The sample contained 3ppm PCB. Please note that PCB's were not detected in the other LE samples analyzed.

Analyst:

ML

Distribution of report: 3c-SWL-Geotechnical Division

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley

Assistant Manager, Analytical Service

002 Lab. No. D-23985

/c11



Construction materials testing, analytical chemistry and geotechnical engineering P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

December 9, 1985

File No.

Report 4

Report of:

Analysis of Soil

Reported to:

Southwestern Laboratories-Geotechnical Division

Attn: Bruce Bailey

Date received:

12/4/85; Delivered by Bob Sneed

Identification:

Trade Waste Lagoon Closure.

Level 1 :--

PEAGL T	<u>LI-1</u>	LI-2	LI-3	LI-4	LI-5
		==-	====	<u>-</u>	====
Arsenic (ppm)	0.1	*0.1	0.1	*0.1	0.1
Barium (ppm)	0.4	0.6	0.1	5.9	0.3
Cadmium (ppm)	*0.01	*0.01	*0.01	*0.01	0.01
Chromium (ppm)	*0.05	*0.05	*0.05	*0.05	*0.05
Lead (ppm)	0.3	0.3	0.2	0.2	0.1
Selenium (ppm)	0.1	*0.1	0.1	*0.1	*0.1
Silver (ppm)	*0.01	*0.01	*0.01	*0.01	*0.01
Nickel (ppm)	0.07	*0.05	0.06	0.29	0.08
Zinc (ppm)	0.05	0.06	0.05	0.56	0.05
Mercury (ppm)	*0.05	*0.05	*0.05	*0.05	*0.05
Endrin (ppb)	*.2	*.2	*.2	*.2	*.2
Lindane (ppb)	*4.0	*4.0	*4.0	*4.0	*4.0 1
Methoxychlor (ppm)	*.1	*.1	*.1	*.1	*.1
Toxaphene (ppb)	*5.0	*5.0	*5.0	*5.0	*5.0
2,4-D (ppm)	*.1	*.1	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*.J1·	*.01	*.01	*.01	*.01
Benzene (ppm)	*.5	*.5	*.5	*.5	*.5
Xylene (ppm)	*.1	*.1	*.1	*.1	*.1
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01	*.01	*.01
Cis-1,3-dichloropropylene (ppm)	*.1	*.1	*.1	*.1	*.1
Cyclohexane (ppm)	*.1	*.1	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.1	*.1	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*.1	*.1	*.1
Naphthalene (ppm)	*.1	*.1	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01	*.01	*.01
pН	6.6	7.0	6.9	7.0	7.2

* None detected, less than

Distribution of report:

3c-Southwestern Laboratories/Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC

Per: Irene C. Hadley

Assistant Manager, Analytical Servic

002 Lab. No. D-24210-1 /cdr



Southwestern Laboratories, Inc.

Construction materials testing, analytical chemistry and geotechnical engineering P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

December 9, 1985

File No. Report 4 (Continued)

Report of:

Analysis of Soil

Reported to:

Southwestern Laboratories-Geotechnical Division

Attn: Bruce Bailey

Date received:

12/4/85; Delivered by Bob Sneed

Identification:

Trade Waste Lagoon Closure,

Level 1

	<u>LI-6</u>	<u>LI-7</u>	<u>LI-8</u>	<u>LI-9</u>
Arsenic (ppm)	0.1	*0.1	*0.1	*0.1
Barium (ppm)	0.1	6.6	0.3	*0.1
Cadmium (ppm)	*0.01	*0.01	*0.01	*0.01
Chromium (ppm	*0.05	*0.05	*0.05	*0.05
Lead (ppm)	0.1	0.2	0.2	*0.1
Selenium (ppm)	*0.1	*0.1	*0.1	*0.1
Silver (ppm)	*0.01	*0.01	*0.01	*0.01
Nickel (ppm)	0.07	0.15	0.13	0.08
Zinc (ppm)	0.03	0.36	0.05	0.01
Mercury (ppm)	*0.05	*0.05	*0.05	*0.05
Endrin (ppb)	*.2	. *.2	*.2	*.2
Lindane (ppb)	*4.0	*4.0	*4.0	*4.0
Methoxychlor (ppm)	*.1	*.1	*.1	*.1
Toxaphene (ppb)	*5.0	*5.0	*5.0	*5. 0
2,4-D (ppm)	*.1	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*.01,	*.01	*.01	*.01
Benzene (ppm)	*.5	*.5	*. 5	*.5
Xylene (ppm)	*.1	*.1	*.1 [']	*.1
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01	*.01
Cis-1,3-dichloropropylene (ppm)	*.1	*.1	*.1	*.1
Cyclohexane (ppm)	*.1	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.1	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*.1	*.1
Naphthalene (ppm)	*.1	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01	*.01
pH	7.0	6.9	7.1	7.0

* None detected, less than

Distribution of report:

3c-Southwestern Laboratories/Geotech

Respectfully submitted,

southwestern laboratories, inc.

Per: Irene C. Hadley

Assistant Manager, Analytical Servic

002 Lab. No. D-24210-2 /cdr



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December 9, 1985

File No. Report 5

Report of:

Analysis of Soil

Reported to:

Southwestern Laboratories-Geotechnical Division

Attn: Bruce Bailey

Date received:

12/4/85; Delivered by Bob Sneed

Identification:

Trade Waste Lagoon Closure

•	LE-2	LI-4	LI-4	LI-7
	Level 2	Level 3	Level 4	Level 4
Arsenic (ppm)	*0.1	*0.1	*0.1.	*0.1
Barium (ppm)	0.2	0.2	0.1	0.1
Cadmium (ppm)	*0.01	*0.01	*0.01	*0.01
Chromium (ppm)	*0.05	*0. 05	*0. 05	*0.05
Lead (ppm)	0.2	*0.1	0.1	0.2
Selenium (ppm)	*0.1	*0.1	*0.1	*0.1
Silver (ppm)	*0.01	*0.01	*0.01	*0.01
Nickel (ppm)	*0.05	*0.05	· *0. 05	0.06
Zinc (ppm)	*0.01	*0.01	*0.01	0.01
Mercury (ppm)	*0.05	*0.05	*0.05	*0.05
Endrin (ppb)	- *.2	*.2	*2	*.2
Lindane (ppb)	*4.0	*4.0	*4.0	*4.0
Methoxychlor (ppm)	*.1	*.1	*.1	*.1
Toxaphene (ppb)	*5.0	*5.0	*5.0	*5.0
2,4-D (ppm)	*.1	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*. 01.	*.01	*.01	*.01
Benzene (ppm)	*.5	*.5	*.5	*.5
Xylene (ppm)	*.1	*.1	*.1	*.1 .
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01	*. 01
Cis-1,3-dichloropropylene (ppm)	*.1	*.1	*.1	*.1
Cyclohexane (ppm)	*.1	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.1	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*. 1	*.1
Naphthalene (ppm)	*.1	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01	*.01
pH	7.2	6.3	6.8	6.7

Distribution of report:

3c-Southwestern Laboratories/Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley

Assistant Manager, Analytical Service

002 Lab. No. D-24210-3 /cdr

SW

SOUTHWESTERN LABORATORIES,

Construction materials testing, analytical chemistry and geotechnical engineering P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

> Report 6 December 20, 1985 File No.

Report of:

Analysis of Soil

Reported to:

Southwestern Laboratories-Geotechnical Division

Attn: Bruce Bailey

Date received: 12/4/85; Delivered by Bob Sneed

Identification: Trade Waste Lagoon Closure

LI-7 and LI-8, Level 1

Reactivity:

Flash-Point (ASTM D-98/80) greater than 150°.

Non-reactive with water.

Non-explosive when mixed with water

When mixed with water, does not generate toxic gases, vapors, or fumes of a sufficient quantity to present a danger to human health or the environment.

Contains less than 5 mg/Kg Sulfide.

Contains less than 5 mg/Kg Cyanide.

Does not detonate or explode when heated.

Distribution of report:

3c-Southwestern Laboratories-Geotech

Respectfully submitted,

SOLITHWESTERN LABORATORIES, INC.

Trene C. Hadley

Assistant Manager, Analytical Servic

002

Lah. No. D-24210

/cdr

Γ	SOUTHWESTERN LABORATORIES	1
	Discussion of QA/QC Program and	
	Laboratory Worksheets	
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	SOUTHWESTERN LABORATORIES	



SOUTHWESTERN LABORATORIES

Dalles Division



Materials, environmental and geotechnical consultation, fundamental testing and analytical services
P.O. Box 224227 • 2575 Lone Ster Drive • Delles, Texas 75264 • 214/631-2700 Metro 263-1133

Southwestern Laboratories, Dallas, QA/QC Program

The Southwestern Laboratories-Dallas Analytical Services

Quality Assurance (QA)/ Quality Control (QC) program is utilized

in order to insure the reliability of analytical data. The purpose

of QA/QC is to monitor the accuracy and precision of results obtained
and reported.

In order to verify the precision of methods, a minimum of ten percent of all samples are duplicated. A blank (zero percent) and a spike (known percent) are analyzed with each set of samples. An applicable standard is run with each set of samples. More than one standard may be required if several compounds are to be quantitated. When relevant, method of standard additions is performed.

The Southwestern Laboratories-Dallas QA/QC report form is completed immediately following the completion of an analysis. QA/QC performance records are maintained on file.

Various instruments utilized in analyses are calibrated on a regular basis. A record of said calibration is maintained in a log book or kept on file.



Construction materials testing, analytical chemistry and geotechnical engineering P.O. Box 224227 • 2575 Lone Star Orive • Dallas, Texas 75264 • 214/631-2700

NAME L. THEATSON	:		DAT	ΓE	10/5	/35		<u>-</u>
TYPE & NUMBER OF ANALYSIS 23758 (CMPCSITE BAUGENING)	BLANK(S) CONCENTRATION	ORIGINAL CONC.	SPIKE ADDED CONC.	(S) FINAL CONC.	Z REC.	I DUPL I 1ST I CONC.	ICATE(S 2ND CONC.	I. DEV
<u>(2-7</u>	(0.05					25.6	27.0	7.7
As - 7	<u> </u>					<u>15.9</u>	16.7	24
85 - 1	<u> </u>					(0.1	101	07
48 - 7	(٧.)					76	1.8	<u>30</u>
Ra -7	<u> </u>					0.2	0.1	<u>33.</u>
G - 7						<u>U.27</u>	0.14	<u> 17.</u>
H9-7	(0.61					< U. UI	<u> </u>	!
ZN -7	(0.01		<u> </u>			2.81	!	!
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A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.

A SPIKE IS AN ANALYSIS WHERE A KNOWN AMOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED AMOUNT TO THE AMOUNT INCREASED X 100 GIVING THE X RECOVERY.

A DUPLICATE IS TWO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE % VARIATION FROM THE MEAN.

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Construction materials testing, analytical chemistry and geotechnical engineering P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

_		DA	TE/	1/4/25			
BLANK(S) CONCENTRATION	I : ORIGINAL : CONC.	SPIKE ADDED CONC.	(S) FINAL CONC.	Z REC.	i ist	LICATE (S 2ND CONC.	
	0.1	50	5.1	/00	(0.1	<u> </u>	 ك_ا
<u> </u>	0.7	<u> </u>	5.1	700	5.8	6.0	7
(0.01	<u> </u>	5.00	433	<u>95</u>	<u> (0.01</u>	70.01	
<u> </u>	10.05	5.00	4.96	100	1005	<u>70.05</u>	<u> </u> _
1,0	6,2	<u>5.0°</u>	4.9	<u>99</u>	0.2	0.2	
(0.01	(0.01	0.02	0,07	700	10.05	10.05	<u> </u>
	10.1	5.0	<u>55</u>	7/0	70.1	<u> 70.1</u>	
	10.01		5.28	<u>/a.</u>	<u> </u>	<0.01	<u> </u>
	0.67	<u> </u>	5.14	<u> 70</u> L	0,29	0.30	
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	CONCENTRATION (0.1 (0.0) (0.0) (0.0) (0.0) (0.0) (0.0)	CONCENTRATION ORIGINAL CONC. (0.1	BLANK(S) SPIKE CONCENTRATION ORIGINAL ADDED CONC. CONC. 40.1	BLANK(S) SPIKE(S) CONCENTRATION ORIGINAL ADDED FINAL CONC. CONC.	BLANK(S) SPIKE(S) CONCENTRATION ORIGINAL ADDED FINAL Z CONC. CONC. REC. 10.1	BLANK(S) SPIKE(S) DUPL CONCENTRATION ORIGINAL ADDED FINAL Z 1ST CONC. CONC. REC. CONC. CONC. CONC. REC. CONC. CON	BLANK(S) I ORIGINAL I CONC. SPIKE(S) ADDED FINAL Z IST 2ND CONC. DUPLICATE IS 2ND CONC. $ \begin{array}{c cccccccccccccccccccccccc$

A DUPLICATE IS TWO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE % VARIATION FROM THE MEAN.

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A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.

A SPIKE IS AN ANALYSIS WHERE A KNOWN ANOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED ANOUNT TO THE AMOUNT INCREASED X 100 GIVING THE X RECOVERY.



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NAME L. THOMPSON			DA	ΓE	/2/10	25		
TYPE & NUMBER OF ANALYSIS 24210 - P, R, S AS BINK	BLANK(S) CONCENTRATION	ORIGINAL CONC.	SPIKE ADDED CONC.	(S) FINAL CONC.	I REC.	DUPL	.ICATE (S 2ND CONC.	ī
As -4	<u> </u>	(0./	5.0	5.1	102	10,1	10./	
BA - 4	<u> </u>	<u></u>	3.0	5.4	<u> 108</u>	0.7	0.2	Ī
G -4	<u> </u>	<u> </u>	5.00	<u>5.42</u>	108	<u> </u>	₹0.01	立
Cp -4		117.65	<u>5.00</u>	5.24	704	70.03	<u> </u>	\Box
P8 -4		<u> </u>	<u> </u>	<u> 34</u>	7%	0.2	<u> </u>	<u> </u>
JE - 4	<u> </u>	(1.1	5.17	<u> 5.7</u>	114	70.1	<u> 70.1</u>	<u> </u>
Ac - 4	(0.0)	(00)	5.1711	<u>5-34</u>	<u>/UR</u>	70.60	<u> </u>	Ţ
N: -4	₹ <u>₽.05</u>	(). Ob	4.10	20c	101	<u>₹0,05</u>	<u> </u>	0
7 _A -4	(0.0)	0.01	5.00	501	101	11.05	<u>70.65</u>	0
						!!	<u> </u>	
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A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.

A SPIKE IS AN ANALYSIS WHERE A KNOWN AMOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED AMOUNT TO THE AMOUNT INCREASED X 100 GIVING THE X RECOVERY.

A DUPLICATE IS THO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE X VARIATION FROM THE MEAN.

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SCUTHWESTERN LABORATORIES, INC.

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NAME L. THOMPSON	DATE12/10/8							
TYPE & NUMBER OF ANALYSIS 242/C -), R, S A/A BLANK	BLANK (S) CONCENTRATION	I ORIGINAL CONC.	SPIKE ADDED CONC.	(S) FINAL CONC.	Z REC.	1 157	LICATE (S 2ND CONC.	
As -4		(0./	5.0	5.1	102	(C.1	(0./	! — ! —
Bu -4	<u> </u>	<u>G./</u>	5.0	5,4	708	0.7	0.2	コ
Gs -4		<u> </u>	5.00	<u>5.42</u>	108	<u> ₹0.01</u>	₹0.01	-
C2 -4	<u> </u>	10.05	3.00	5.24	704	70.03	<u> </u>	<u> </u>
PR -4		0,1	<u> </u>	<u> </u>	<u> </u>	<u>C.2</u>	<u> </u>	:
SE - 4			5.0	5.7	114	70.1	70.1	<u>-</u>
Ac - 4	(0.0)	<u> </u>	5.00	534	<u>-√CR</u>	70.00	(0.01	\equiv
N: -4		0.0k	4.10	<u> 20</u> -	-/01	1005	<u> </u>	
71-4		0.07	5.00	<u> 501/-</u>	701	<u>গল্ভ</u>	70.0	<u></u>
14510 5-7								
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P= LF-Z LEVEL Z	_					!	<u> </u>	-
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APPROVED	DATE	٠,

EARBLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.

ANSPIKE IS AN ANALYSIS WHERE A KNOWN AMOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED AMOUNT TO THE AMOUNT INCREASED X 100 GIVING THE X RECOVERY.

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NAME L. TACAIRCO			DA	TE	12/11	185		
TYPE & NUMBER OF ANALYSIS 24270-Q PCR P, C, R, S	BLANK(S) CONCENTRATION	I DRIGINAL CONC.	SPIKE ADDED CONC.	(S) FINAL CONC.	Z REC.	1 157	.ICATE (S 2ND CONC.	7 De
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A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.

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APPROVED	DATE	_
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Construction materials testing, analytical chemistry and geotechnical engineering P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME MIKE Lee			DA ⁻	TE 9-20-85						
TYPE & NUMBER OF ANALYSIS Pos+ L H21b 5	BLANK(S) CONCENTRATION	I ORIGINAL CONC.	SPIKE ADDED CONC.	FINAL CONC.	Z REC.	DUPL 1ST CONC.	ICATE (S 2ND CONC.			
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NAME MIKELLE	_		₩П	'	9-			
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NAMEM. K-2 Lee		DATE 12-5-85									
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v aii Construction materials testing, analytical chemistry and geotechnical engineering
22. P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAMEMIKELEZ			DATE 12-9-85						
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NAMEMike Lee			DA	TE	10-1	16 1	17	
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Dallas Division



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CHAIN OF CUSTODY RECORD

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CHAIN OF CUSTODY RECORD

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CHAIN OF CUSTODY RECORD

				SAMPLERS (Square)							
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E. HAZARDOUS WASTE MANIFEST DOCUMENTS

STATE OF LOUISIANA

DEFECTMENT OF ENVIRONMENTAL QUALITY
HAZARDOUS WASTE DIVISION
P.O. BOX 44307
BATON ROUGE, LOUISIANA 70804

	(12-pitch) typewriter.)	V	Form Approv	ed. OMB No	. 2000-0404. E	Expres 7-31-
UNIFORM HAZARDOUS	1. Generator's US EPA ID No. 1. X. N.O. O. P. O. 1. 8. O.O.	Manifest Ligocyment No.	2. Page 1	is not	tion in the shi	ded areas
3. Generator's Name and Mailing Add	11 -X-170 88-0-1-8-00.	100066	,	law.	ocument Nu	mhar .
General Morans Asse 2525 E. Abram. , Arl	in bly Div.		Co C	67	661	4
4. Generator's Phone (F17) 6 5. Transporter 1 Company Name	49-6353 6. USEPA	ID Number	C.State Yr	o34		
STrance	12.4.00.6.5				4504161	
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11. US DOT Description (Including Proper	Shipping Name, Hezard Class, and ID	Number 12.Conta	iners	13. Total	14. Unit	
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18. Special Handling Instructions and Ar	idicional Information				Act of the second	
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eccording to applicable international and not Unless I am a small quantity generator t	the has been exempted by statute or i	egulation from the	duty to mai	o a weste	minimization	certification
under Section 3002(b) of RCRA, I also or have determined to be economically pro- minimises the present and future street to be	ticable and I have selected the method	reduce the volumes of treatment, store	and toxicity 190, or diapo	of wesse (penerated to the second	he degree l me which
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Ken Maria	Signature	~~h				Doy You
17. Transporter 1 Acknowledgement of I		\				Date
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18. Transporter 2 Acknowledgement or i	Receipt of Materials	CAM YETTL	LAM	-		Dete
Printed/Typed Name	Signature				Menth I ·	Day Yes
19. Discrepancy Indication Space						
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20. Facility Owner or Operator: Certification 19.	n of receipt of hezerdous meterials o	overed by this me	nifest excep	nt as notes	d in	
Printed/Typed Name					1	Dese Yes
TEZZZY EANY THAN	Signature					13185

STATE OF LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY HAZARDOUS WASTE DIVISION P.O. BOX 44307 BATON ROUGE LOUISIANA

BATON ROUGE, LOUISIANA 70804

UNIFORM HAZARDOUS	Generator's US EPA ID No.	Manifest	17 Page 1		0-0404 Expires 7-31- n the shaded areas
WASTE MANIFEST	T : H · D · O · O · 8 · O · 1 · 8 · O · O	4 Document No.	0		ured by Federal
3. Generator's Name and Mailing Addre General Motors, CPC Group	100	11 (1 (1)		Andest Docum	ent Humber
			in the f	00675	1.9 5 4 5 4
2525 E. Abram,	•			energior's D	
Arlington, Texas 76010 4. Generator's Phone (917) 6/	0 6250		20247		
5. Transporter 1, Company Name		ID Number	C.Bente	tausbound, p. 10	97081
Chemical Waste Management	T. X. D. 9. 8. 0.	7.4.4.4.8.6	O.Transpo	rier's Phone	713-427-677
7. Transporter 2 Company Name	8. US EPA	ID Number	4.7	isustants (I)	The second secon
			2 13 4 5 5 7 4	ner's Phone	
9. Designated Facility Name and Site /		ID Number	1 July 20	cuty C. ID	
Chemical Waste Management, Route 2, John Brannon Road	inc.		Z0022	. Phone	
Carlyss, Louisiana 70663	L ·A ·D ·O ·O ·O ·	7.7.7.2.0.1	4. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.		
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11. US DOT Description (Including Proper S	Shipping Name, Hezerd Class, and ID	Numbers No.	Type	Total : Uni	The same in case
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Additional Descriptions for Manufacture			and the state of	Codes for Man	In Land Alone
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And the second s			Figure	- L	
5. Special Handling Instructions and Ad If spilled in Louisiana, co	ditional Information	itr (504) 92	5-6595	and General	tor.
Kent Moon, home (214) 223-	9190: office (817) 649-	6350.	, ,,,,,		,
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generation's CERTIFICATION: I hereby proper shipping name and are classified, pech	fectore that the contents of this consignm od, morked, and labeled, and are in all res	ent are fully and accu pacts in proper condit		ood above by nort by highway	
according to applicable international and national	onal government regulations.				•
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have determined to be economically pract	icable and I have colocted the metho	d of treatment, stor			eliable to me which
minimises the present and future threat to by	<u> </u>	/_	سر		Dete
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7. Transporter 1 Acknowledgement of F Printed/Tyded Name		7	.,		Month Day Ye
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19. Discrepancy Indication Space					
O Facility Owner or Operator Continue	and preside all housestorn materials	amend he ship on	niles suc	nd an accordis	
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TEXAS DEPARTMENT OF WATER RESOURCES P.O. Box 13087, Capitol Station Austin, Texas 78711



Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form approved. OMB No. 2000-0404. Expires 7-31-86

Ц		JNIFORM HAZARDOUS WASTE MANIFEST		· Doc	anifest iment No.	2. Pa	is not	require	the shade d by Fede	
ΙĨ	3. Generator's Name and Mailing Address General Motors, CFC Group 2525 E. Abron, R. State Manifest Document Number 10 1543 H									
$\ \ $	4. Generator's Phone (76010 817 649-6350					B. State Generator's ID				
Ш	5. Tr	ansporter 1 Company Name	6 .	US EPA ID Number (C.D. 0.5.0.6.4.1	or 4 6 3		ite Transporte			2-346
		ansporter 2 Company Name	8.	US EPA ID Numbe			insporter's Pho te Transporter			
		·	1.			F. Tra	nsporter's Pho	NO	na i byrazan	
		esignated Facility Name and Site Address Environment at Serv		US EPA ID Numb	981	G. Su	te Facility's ID	tima (01429 ii	1\3
	ŀ	0. Box 609, 2027 Battles er Park, TX 7 <mark>7536</mark>	round Ka. T 1	C.D.C.5.5.1.4.1	.3 .7 :B	H. Fac	ility's Phone	ETE (713747	9-600
	11A HM	11. US DOT Description (including P Number)	roper Shipping Name	, Hazard Class, and ID	12. Conta No.	iners Type	13. Total Quantity	14. Unit Wt/Val	11 Mare	No
•	/	Herardous Waste Sciid ORM-E NA9189	5.0.S.		0 G.	D-7	22	Y	95011	0
BOTABUE		b.		•			• • •	•	11 .01 1 .01	1
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		ipecial Handling Instructions and Addi		n, hone (214)	23-919	0; oi	fice (81	7) 64	•	•
	8	ENERATOR'S CERTIFICATION: I he bove by proper shipping name and are ransport by highway according to appl agulations.	classified, packed, m	arked, and labeled, and	are in all re	Spects i	in proper condi	ition for		
V	P	rinted/Typed Name	•	Signature	<u></u>	1 ~ "			Month De	y Year
7	17. T	ransporter 1 Acknowledgement of Re-	celpt of Materials	- 1	1		-		Dat	•
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-40-1	18. L	hiscrepancy Indication Space								
	20. F	aculity Owner or Operator: Certification	of receipt of hazardo	•	this manife	st exce	pt as noted in h	em 19.		ţ.
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RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone CallDiscussionField Trip ConferenceOther(Specify)				
T0: John Wankum Utility Engineer, Water Department, City of Arlington, TX (817) 275-5931	From: $\mathcal{K}W$ Raymond Wayne, FIT Hydrologist	Date: 5/24/89 Time: 1:40 PM			
SUBJECT: G. M. Assembly - PA (TXD008018004)					
SUMMARY OF COMMUNICATION	V				
His utility serves drink	ting water to the entire area within	four miles of			
the site except for that	portion supplied by the City of Gra	and Praire			
Water Department: He wi	all send me a map of his service area	near the			
site.					
Arlington obtains their	water supply from:				
1) Cedar Creek Reservoir					
2) Richland Chambers Res	servoir				
3) Village Creek Watersh	ed				
4) One well aproximately	5 to 6 miles south of the site				
He doesn't know if anyon	e has their own drinking water wells	with 4 miles of			
site.	site.				
Arlington serves approxi	mately 70,000 connections.				
CONCLUSIONS, ACTION TAKEN OR REQUIRED					
Ÿ					
INFORMATION COPIES TO:					

RECORD OF (Record of Item Checked Below) x Phone Call Discussion Field Trip Conference Other(Specify)						
TO: Wilburn White Utility Supervisor, Water Department	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/24/89				
City of Grand Prairie, TX (214) 660-8164	annymona wayssay iii ayatalagala	Time: 3:30 PM				
SUBJECT: G. M. Assembly	7 - PA (TXD008018004)					
SUMMARY OF COMMUNICATION	V					
Within 4 miles of the si	ite, the Grand Prairie Water Departme	ent serves				
drinking water to those	areas not served by Arlington. Then	re are no other				
utilities serving the ar	rea and he does not know of any domes	stic drinking				
water wells. The two us	cilities border approximately 1 mile	east of Highway				
360.						
His utility serves appro	eximately 28,000 connections. The se	ervice network				
is completely interconne	ected. They buy water from Fort Work	th (10% of supply)				
and Dallas (40% of suppl	y). Grand Prairie has 11 drinking v	water wells				
providing 50% of the sup	providing 50% of the supply. The nearest wells are 5 miles due east of					
the site and 5 miles sou	theast of the site.					
He drives near the site	on a regular basis and knows of no a	agricultural				
land (cropland) within 4	miles of the site.					
·						
CONCLUSIONS, ACTION TAKEN OR REQUIRED						
INFORMATION COPIES TO:						

RECORD OF COMMUNICATION (817) 334-2961	COMMUNICATION					
TO: Joe Johnston, Biologist Ecological Services, United States	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/25/89				
Fish & Wildlife Service Fort Worth, Texas		Time: 11:30 AM				
SUBJECT: G. M. Assembly	7 - PA (TXD008018004)					
SUMMARY OF COMMUNICATION	V .					
There are no critical ha	abitats for federally listed endanger	ed species				
within 4 mmiles of the s	site.					
There may be sensitive e	environments within 4 miles of the si	te. I would				
have to send him a copy	of my map with the 4 mile radius and	he will check				
his maps for sensitive e	environment designations.					
		•				
CONCLUSIONS, ACTION TAKEN OR REQUIRED						
INFORMATION COPIES TO:						

RECORD OF COMMUNICATION						
TO: Eddy Mack Engineering Assistant, Texas Air Control Board	From: ## Raymond Wayne, FIT Hydrologist	Date: 5/24/89				
Region 8, Fort Worth, Texas (817) 732-5531	naymond wayney, 111 nya1010g15t	Time: 2:30 PM				
SUBJECT: G. M. Assembly	SUBJECT: G. M. Assembly - PA (TXD008018004)					
SUMMARY OF COMMUNICATION	V					
There are about 8 to 12	air permits for this site. The perm	nits relate				
to an area or activity (auto painting, final repair painting	g, incinerator,				
etc.).						
He has been to the site	and is familiar with the facility for	or the last				
two years. He is not aw	vare of any major problem at the fact	llity. There				
was a situation where pr	was a situation where primer surfacer (chemical used to help bond primer					
paint to metal surfaces)	was over the required limit, but wa	s below required				
limits when retested.						
		•				
		1				
CONCLUSIONS, ACTION TAKEN OR REQUIRED						
INFORMATION COPIES TO:						

EPA FORM 1300-6 (7-72) Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF (Record of Item Checked Below) x Phone Call Discussion Field Trip COMMUNICATION (Conference Other(Specify))					
TO: Wilma Stevenson Administrative Technician,	From:	Date: 5/5/89			
Information and Technical Services Texas Water Commission Austin, Texas (512) 463-8174	Raymond Wayne, FIT Hydrologist	Time: 1:20 PM			
SUBJECT: G. M. Assembly	7 - PA (TXD008018004)				
SUMMARY OF COMMUNICATION	V				
RCRA Part B Application	requested 5/15/84.				
Part B not submitted bed	cause the drum storage area and surfa	ace impoundment			
were closed.					
Part A Application with	drawn by G.M. on 6/18/87.				
		,			
CONCLUSIONS, ACTION TAKEN OR REQUIRED					
					
INFORMATION COPIES TO:					

RECORD OF (Record of Item Checked Below) x Phone Call Discussion Field Trip (817) 334-4685 Conference Other(Specify)						
TO: Sid Ricks Conservation Officer, United States Soil	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/25/89				
Conservation Service, Fort Worth, Texas	and may not the state of the st	Time: 1:15 PM				
SUBJECT: G. M. Assembly	- PA (TXD008018004)					
SUMMARY OF COMMUNICATION	V					
The area within 4 miles	of the site is highly urbanized. The	hey last worked				
near the site in 1979.						
The agricultural land wi	thin 4 miles of the site is pasture	, hay producing				
and graze land. There a	are no crops used for direct human co	onsumption				
grown within 4 miles of	the site.					
Water for the agricultur	cal land comes from rainfall. The la	and is not				
usually irrigated.						
·						
	· · · · · · · · · · · · · · · · · · ·					
CONCLUSIONS, ACTION TAKEN OR REQUIRED						
INFORMATION COPIES TO:						

RECORD OF COMMUNICATION						
(817) 459–5900	ConferenceOther(Specify)	1 of 2				
TO: Craig Powell, Senior Pollution Control Officer	From: ### Raymond Wayne, FIT Hydrologist	Date: 5/15/89				
Water Dept. City of Arlington, TX	Raymond wayne, 111 hydrologist	Time: 3:00 PM				
SUBJECT: G. M. Assembly - PA (TXD008018004)						
SUMMARY OF COMMUNICATION	V					
He worked in his departm	ment for 10 years and is familiar wi	th G.M.				
G.M. has a written permi	it to discharge treated wastewater in	nto the Arlington				
sanitary sewer system.	The permit specifies water quantity	and quality				
standards. The permit p	process began in 1972 (Clean Water Ad	et). G. M.				
received a permit at tha	at time. Since 1972, the permit requ	uirements have				
been tightened. G. M. h	nas been in compliance with permit st	tandards ("they				
have a very good record). If minor problems were identified	ed, they were				
corrected.						
Process liquids, and sur	face water runoff from process areas	s, flow into the				
treatment system at G. M	. and into the sanitary sewer system	n. G. M. has				
an effective surface wat	er runoff containment system for its	hazardous				
waste areas. Surface wa	ter runoff from non-process areas fl	ow into the				
storm sewer system. "An	y hazardous waste getting into the s	torm sewer system				
would be the result of a	n accidental spill, and not routine	facility				
operations".						
The storm sewer system is overseen by the Arlington Health Department.						
Steve Rothwell (817/459-5900, Ext. 7063) investigated the recent fuel oil						
spill to the storm sewer system at the site.						
Storm water from G. M. enters the sewer system, is mixed with storm water						
from other sources (incl	from other sources (including industrial facilities), and flows north to					
INFORMATION COPIES TO:						

EPA FORM 1300-6 (7-72) Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION	1 <u></u> • •					
T0: Craig Powell (817) 459-5900 (Continued)	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/25/89				
Continuedy	Raymond wayne, FII nydrologist	Time: 3:00 PM				
SUBJECT: G. M. Assembl	y - PA (TXD008018004)					
SUMMARY OF COMMUNICATION	N .					
a lake at Six Flags Par	k. The conduit is mostly an open,	concrete-lined				
ditch. The lake discha	rges (overflow spillway) into Johnso	on Creek.				
G. M. is storing contam	inated ground water (from the oil sp	oill) on-site				
and proposes to process	it in its wastewater treatment fac:	ility for eventual				
discharge to the Arling	ton sanitary sewer system.					
		<u> </u>				
	,	-				
CONCLUSIONS, ACTION TAKEN OR REQUIRED						
INFORMATION COPIES TO:						

EPA FORM 1300-6 (7-72) Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

TEXAS WATER COMMISSION

Ref. 19 30347

Paul Hopkins, Chairman Ralph Roming, Commissioner John O. Houchins, Commissioner



C. Martin Wilson III, General Counse! James K. Rourke, Jr., Chief Examiner Mary Ann Hefner, Chief Clerk

Larry R. Soward, Executive Director

Paul Cooper

June 18, 1987

Mr. D.W. Tunstall General Motors Corporation 2525 East Abram Street Arlington, Texas 76010

Re: General Motors Corp.
Application No. 10411
Registration No. 30347
U.S. EPA I.D. No. TXD008018004

Dear Mr. Tunstall:

we have reviewed Part A - Facility Background Information for the above referenced site and also the Affidavit of Exclusion which was submitted for the purpose of withdrawing the hazardous waste permit application from further consideration in accordance with the exclusion claimed.

Based on our review of Part A and the Affidavit of Exclusion, the application for a hazardous waste permit has been withdrawn. We are retaining certain portions of the Part A for incorporation into your solid waste registration file.

Should you have any questions regarding this matter, please do not hesitate to contact Ms. Wilma Varner of my staff at 512/463-7764.

Sincerely,

Russell S. Kimble.

Russell S. Kimble, Chief Reports and Management Section Hazardous and Solid Waste Division

WV:ok



GM Canada

Ref. 20 / MW

Chevrolet-Pontlac-Canada Group

Arlington Plant

General Motors Corporation 2525 East Abram Street Arlington, Texas 76010-1390

December 15, 1986

Texas Water Commission, District 4 203 James Collins Blvd. Duncanville, Tx 75116-4818

Good Day,

An accidental discharge of paint thinner from our facility was reported to you Friday morning, December 5, 1986. This letter is simply to confirm and document the information which was provided to you at that time.

Approximately 1500 gallons of virgin paint thinner, consisting of xylene, toluene and methyl ethyl ketone, was accidentally discharged between 5:00 and 5:30 am through an open valve located in our Paint Mix Building into an excavation approximately 10-15 foot west of Paint Mix. This excavation was about 5 foot deep and was dug in preparation for the construction of a road bed. The Paint Mix Building is detached from the assembly plant, and is located to the west of the assembly building. No injuries were incurred as a result of this incident.

250 - 350 gallons of the thinner was vacuumed out of the pit or collected from the floor of the Paint Mix Building. Around 21 cubic yards of soil was removed from the excavation and will be disposed of as hazardous waste. An unknown portion of the thinner was carried by a trade waste line through a primary treatment plant, the grit separator, and into the Waste Water Treatment Plant where it was contained.

The Texas Water Commission, as well as the National Response Center, were notified the morning of December 5. TWC visited the site around 11:00 the same day.

Please feel free to refer any questions concerning this incident to:

JoAnne M. Pritchard CPC Arlington - General Motors Corp. Safety Department 2525 E.Abram Arlington, TX 76011 817-649-6277-8

Ron Lee

For Personnel Director

cc: National Response Center G.Giles, Production Manager R.Murday, Plant Engineer GEIVE

DEC 1 9 8

DISTRICT 1



Ref. 2/ 20 Chevrolet-Pontiac-Canada Group

Chevrolet-Pontiac-Canada Group Arlington Plant General Motors Corporation 2525 East Abram Street Arlington, Texas 76010-1390

April 8, 1989

certified mail, return receipt

Texas Water Commission, District 4 203 James Collins Blvd. Duncanville, TX 75116-4818

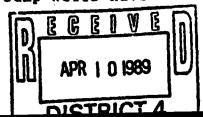
Good Day.

This letter is to confirm and document the information that was provided to you by telephone on April 4, 1989 regarding an accidental discharge of #2 fuel oil at the General Motors CPC Arlington Plant in Arlington, Texas. This incident was initially reported to your officer, Mr. Hichard Clark on April 4, 1989 at approximately 12:25pm.

We were notified by city water officials at approximately 10:00am on April 4, 1989 that oil was reported in storm sewers by TDC Corporation, located approximately 1 mile north of our property line. Our preliminary investigation identified the source as the storm sewers at the north end of our property. We immediately initiated containment and clean-up operations off-site and on-site through our own efforts and those of our contractors.

Our investigation reveals at this time that the source of the incident is an underground #2 fuel oil storage tank farm consisting of 6-48,000 gallon tanks used for emergency heating fuel. The preliminary assessment indicates that the condition may have occurred due to mechanical failures resulting in a tank overfill situation with an estimated release on-site in the 15,000 - 40,000 gallon range. Some of the materials seeped with ground water into an on-site storm drain leading to an interceptor station. From this interceptor it is estimated that approximately 100 gallons exited the property through a storm drain.

The on-site storm drain and all off-site cleaning efforts are nearing completion. Daily reviews of the off-site areas and appropriate actions as needed will continue for a minimum of two weeks. As a precaution, all soil, foliage, absorbent materials, contaminated water/fuel etc. recovered from these areas is being disposed of as hazardous waste. Containment measures including trenching and sump wells have



been implemented at the tank farm. Two wells drilled on the tank farm are yielding fuel and water. This is being fractioned on-site. The fuel is being retained for future use and the water treated in our waste water treatment plant.

In addition to our notification of TWC, the National Response Center (Petty Officer Sandahl, Report #4852, 12:00 pm April 4, 1989) the EPA (Mr. Charles Gazda, 12:11 pm April 4, 1989) and the Arlington Local Emergency Planning Committee (Mr. Douglas Penlen, 10:40 am April 5, 1989) were notified. We are investigating ways to ensure that this incident does not reoccur.

Please feel free to refer any questions concerning this incident to:

> Joanne M. Pritchard CPC Arlington - General Motors Corporation 2525 E. Abram Street Arlington, Texas 76010 817-652-2376

> > Plant Engineer

cc: National Response Center Mr. Jack Mathews, Arlington LEPC

Environmental Protection Agency, Region 6

Dangerous Properties of Industrial Materials

Seventh Edition

Volume II

N. IRVING SAX and RICHARD J. LEWIS, SR. HR: 3

BAG500 BARBITURATES

DERIVATIVES OF BARBITURIC

ACID, I.E.

BARBITAL SODIUM

BARBITAL BARBITONE

SYNS:

THR: Salts or derivatives of barbituric acid. They are central nervous system depressants and are used as hypnotics, sedatives and anesthetics. Usually administered orally. They are strongly habit forming. Several compounds including amo-, seco-, and pentabarbital are restricted chemicals. Their use can cause a reaction called barbiturism which is marked by chills, headache, fever, and cutaneous eruptions. See BARBITAL SODIUM.

BAG750

HR: 1

BARBITURIC ACID

mf: C₄H₄O₃N₂

mw: 128.1

PROP: Crystals or white to yellow-white powder, mp: 245°, bp: 260° (decomp).

THR: Mildly toxic. Irritating to skin, eyes and mucous membranes. An allergen. Has no hypnotic properties. Combustible.

BAH250

HR: 3

BARIUM

CAS: 7440-39-3

NIOSH: CA 8370000

DOT: 1399/1400/1854 af: Ba aw: 137.36

PROP: Silver-white, sltly lustrous, somewhat malleable metal. Mp: 725°, bp: 1640°, d: 3.5 @ 20°, vap press: 10 mm @ 1049°.

Reported in EPA TSCA Inventory. Community Right To Know List.

ACGIH TLV: TWA 0.5 mg/m³ DFG MAK: 0.5 mg/m³

DOT Classification: Some barium compounds are flammable or explosive

THR: See BARIUM COMPOUNDS. Water and stomach acids solubilize barium salts and can cause poisoning. Symptoms are vomiting, colic, diarrhea, slow irregular pulse, transient hypertension, and convulsive tremors and muscular paralysis. Death may occur from a few hours to a few days. Half-life of barium in bone has been estimated at 50 days. Dust is dangerous and explosive when exposed to heat, flame, or chemical reaction. Violent or explosive reaction with water; CCl₄; fluorotrichloromethane; trichloroethylene; and C₂Cl₄. Incompatible with acids; C₂Cl₃F₃; C₂H₂FCl₃; C₂HCl₃ and water; 1,1,2-trichloro trifluoro ethane; and fluorotrichloroethane. The powder may ignite or explode in air or other oxidizing gases. For further information, see Vol. 3, No. 4 of DPIM Report.

BAH500

HR: 3

340

BARIUM ACETATE

CAS: 543-80-6

NIOSH: AF 4550000

mf: C₄H₆O₄•Ba

mw: 255.44

PROP: White crystals. Water-sol.

ACETIC ACID, BARIUM SALT

OCTAN BARNATY (CZECH)

BARIUM DIACETATE

TOXICITY DATA: CODEN:

MarJV# 29MAR77 orl-rat LD50:921 mg/kg ivn-mus LD50:11 mg/kg TXAPA9 22,150,72 **EQSSDX 1,1,75** orl-rbt LDLo: 236 mg/kg **EQSSDX 1,1,75** scu-rbt LDLo:96 mg/kg ivn-rbt LDLo: 12 mg/kg **EQSSDX 1,1,75**

Reported in EPA TSCA Inventory. Barium and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 500 ppm

ACGIH TLV: TWA 0.5 mg(Ba)/m³

THR: Poison via ingestion, intravenous and subcutaneous routes. When heated to decomposition it emits acrid smoke and fumes. See also BARIUM COMPOUNDS.

BAH750

HR: 3

BARIUM ACETYLIDE

CAS: 12070-27-8

mf: C₂Ba mw: 161.35

Barium and its compounds are on the Community Right To Know List.

Ignites on contact with vapors of water or ethanol in air. Incandescent reaction when heated with: hydrogen @ 150°C; chlorine @ 140°C; bromine @ 130°C; iodine @ 122°C; and selenium @ 150°C. See also BARIUM COM-POUNDS and ACETYLIDES.

BAI000

HR: 3

BARIUM AZIDE

CAS: 18810-58-7

NIOSH: CQ 8500000

DOT: 0224

mf: BaN₆ mw: 221.40

PROP: Monoclinic prisms. Mp: -N₂ @ about 120°, bp: explodes, d: 2.936.

SYN: BARIUM AZIDE, dry or containing less than 50% water (DOT)

Reported in EPA TSCA Inventory. Barium and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 0.5 mg(Ba)/m³ ACGIH TLV: TWA 0.5 mg/(Ba)m³

DOT Classification: Class A Explosive; Label: Explosive A and Poison

ENVRAL 32,72,83

SYNS:

CULPEN

6-(3-(2-CHLORO-6-FLUOROPHE-NYL)-5-METHYL-4-ISOXAZOLE-CARBOXAMIDO)PENICILLANIC ACID SODIUM SALT

FLOXACILLIN SODIUM MONO-HYDRATE FLOXAPEN FLUCLOXACILLIN SODIUM MONOHYDRATE

TOXICITY DATA:

orl-mus LD50:3800 mg/kg scu-mus LD50:2200 mg/kg CODEN: MEIEDD 10,589,83 MEIEDD 10,589,83

STAPHYLEX

THR: Moderately toxic by ingestion and subcutaneous routes. When heated to decomposition it emits very toxic fumes of Cl⁻, F⁻, NO_x, Na₂O and SO_x. See other penilillin entries.

CHJ250

HR: 3

3-CHLORO-2-FLUOROPROPENE

CAS: 6186-91-0 mf: C₃H₄ClF

NIOSH: UC 7700000

mw: 94.52

SYN: 3-CHLORO-2-FLUORO-1-PROPENE

TOXICITY DATA:

CODEN:

orl-rat LD50:280 mg/kg ihl-rat LCLo: 1000 ppm/4H skn-rbt LD50: 200 mg/kg

AIHAAP 23,95,62 AIHAAP 23,95,62 AIHAAP 23,95,62

THR: Poison by ingestion and skin contact. Mildly toxic by inhalation. When heated to decomposition it emits very toxic fumes of F⁻ and Cl⁻. See also CHLORINATED HYDROCARBONS, ALIPHATIC; and FLUORIDES.

CHJ500

HR: 3

NIOSH: FS 9100000

CHLOROFORM

CAS: 67-66-3 **DOT: 1888**

mw: 119.37 mf: CHCl₃

PROP: Colorless liquid; heavy, ethereal odor. Mp: -63.5° bp: 61.26°, fp: -63.5°, flash p: none, d: 1.49845 @ 15°, vap press: 100 mm @ 10.4°, vap d: 4.12.

SYNS:

NCI-CO2686

SLOROFORME (FRENCH) LOROFORMIO (ITALIAN) FORMYL TRICHLORIDE METHANE TRICHLORIDE METHENYL TRICHLORIDE METHYL TRICHLORIDE

RCRA WASTE NUMBER U044 TCM TRICHLOORMETHAAN (DUTCH) TRICHLORMETHAN (CZECH) TRICHLOROFORM TRICHLOROMETHANE TRICLOROMETANO (ITALIAN)

TOXICITY DATA:

R 20 (REFRIGERANT)

skn-rbt 10 mg/24H open MLD skn-rbt 500 mg/24H MLD eve-rbt 148 mg eye-rbt 20 mg/24H MOD oms-grh-ihl 562 mg/L sce-hmn:lym 10 mmoi/L dnd-rat-orl 1 µmol/kg dns-mus-ipr 50 mg/kg

CODEN: AIHAAP 23,95,62 28ZPAK -,27,72 AIHAAP 37,697,76 28ZPAK -,27,72 MUREAV 113,467,83 ENVRAL 32,72,83 CBINA8 33,301,81 TOLED5 21,357,84

dnd-mam:lym 1 mmol/L TOLED5 11,243,82 orl-rat TDLo: 1260 mg/kg (6-15D TXAPA9 29,348,74 preg): TER ihl-rat TCLo:30 ppm/7H (6-15D TXAPA9 28,442,74 preg): TER orl-mus TDLo:2115 mg/kg (3W **EVHPAZ 46,127,82** male/3W pre-5D post): REP **FAATDF 5,760,85** orl-rat TDLo: 13832 mg/kg/2Y-NCITR* NCI-CG-TRorl-mus TDLo:127 gm/kg/92W-I:CAR 0,76 orl-rat TD:98 gm/kg/78W-I: NCITR* NCI-CG-TR-0.76 **NEO** ori-mus TD:18 gm/kg/17W-I: JNCIAM 5,251,45 **NEO** EVHPAZ 31,171,79 orl-rat TD: 7020 mg/kg/78W-I: CAR orl-rat TD:70 gm/kg/78W-I: NCITR* NCI-CG-TR-**NEO** 0,76 orl-mus TD: 24752 mg/kg/2Y-FAATDF 5,760,85 C:ETA orl-rat TD:58968 mg/kg/2Y-C: FAATDF 5,760,85 NEO ihl-hmn TCLo: 10 mg/m³/1Y: IRGGAJ 24,127,67 CNS,GIT ihl-hmn TCLo:5000 mg/m³/7M: AHBAAM 116,131,36 **CNS** ihi-hmn LCLo: 25000 ppm/5M TABIA2 3,231,33 orl-hmn LDLo: 140 mg/kg 32ZWAA 8,275,74 unr-man LDLo: 546 mg/kg 85DCAI 2,73,70 orl-rat LD50:908 mg/kg JPFCD2 17,205,82 AIHAAP 23,95,62 ihl-rat LCLo: 8000 ppm/4H orl-mus LD50:36 mg/kg ATSUDG 2,371,79 PCOC** -,230,66 ihl-mus LC50:28 g/m³ TXAPA9 45,861,78 ipr-mus LD50: 1484 mg/kg scu-mus LD50:704 mg/kg JPETAB 123,224,58 orl-dog LDLo: 1000 mg/kg QJPPAL 7,205,34 PCOC** -,230,66 ihl-dog LC50: 100 g/m ipr-dog LD50: 1000 mg/kg TXAPA9 10,119,67 ivn-dog LDLo:75 mg/kg QJPPAL 7,205,34 ihl-cat LCLo:35000 mg/m³/4H AHBAAM 116,131,36 **AEXPBL 97,86,23** orl-rbt LDLo:500 mg/kg ihl-rbt LC50:59 gm/m3 PCOC** -,230,66 QJPPAL 7,205,34 scu-rbt LDLo: 800 mg/kg orl-gpg LD50:820 mg/kg GISAAA 48(3),10,83

sce-mus-orl 200 mg/kg/4D-I

IARC Cancer Review: Animal Limited Evidence IMEMDT 1,61,72; Human Limited Evidence IMEMDT 20,401,79; Animal Sufficient Evidence IMEMDT 20,401,79; NCI Carcinogenesis Bioassay (gavage); Clear Evidence: mouse, rat NCITR* NCI-CG-TR, 1976. Reported in EPA TSCA Inventory. EPA Genetic Toxicology Program. EPA Extremely Hazardous Substances List. Community Right To Know List.

FLCRAP 1,197,67 **AEXPBL 97.86.23**

AEPPAE 138,65,28

OSHA PEL: CL 50 ppm

ihl-gpg LCLo: 20000 ppm/2H

ihl-mam LCLo: 25000 ppm/5M

ihl-frg LCLo:6000 mg/m³

ACGIH TLV: TWA 10 ppm; Suspected Carcinogen

DFG MAK: 10 ppm (50 mg/m³)

NIOSH REL: (Waste Anesthetic Gases and Vapors) CL 2

ppm/1H; (Chloroform) CL 2 ppm/60M

929

pot Classification: ORM-A; Label: None; IMO: Poison B, Label: Poison

THR: A human poison by ingestion and inhalation. An experimental poison by ingestion and intravenous routes. Moderately toxic experimentally by intraperitoneal and subcutaneous routes. A suspected human carcinogen. An experimental carcinogen, neoplastigen, tumorigen and teratogen. Human systemic effects by inhalation: hallucinations and distorted perceptions, nausea, vomiting, and other unspecified gastrointestinal effects. Human mutagenic data.

Inhalation of the concentrated vapor causes dilation of the pupils with reduced reaction to light, as well as reduced intraocular pressure (experimental). In the initial stages there is a feeling of warmth of the face and body, then an irritation of the mucous membranes, conjunctiva, and skin; followed by excitation, loss of reflexes, sensation, and consciousness. Prolonged inhalation will bring on paralysis accompanied by cardiac respiratory failure and finally death.

Chloroform has been widely used as an anesthetic. However, due to its toxic effects, this use is being abandoned. Concentrations of 68,000-82,000 ppm in air can kill most animals in a few minutes. 14,000 ppm may cause death after an exposure of from 30 to 60 minutes. 5,000-6,000 ppm can be tolerated by animals for 1 hour without serious disturbances. The maximum concentration tolerated for several hours or for prolonged exposure with slight symptoms is 2,000-2,500 ppm. Prolonged administration as an anesthetic may lead to such serious effects as profound toxemia and damage to the liver, heart and kidneys. Experimental prolonged but light anesthesia in dogs produces a typical hepatitis.

Explosive reaction with sodium + methanol; sodium methoxide + methanol. Mixtures with sodium or potassium are impact sensitive explosives. Reacts violently with acetone + alkali (e.g., sodium hydroxide; potassium hydroxide; or calcium hydroxide); Al; disilane; Li; Mg; methanol + alkali; nitrogen tetroxide; perchloric acid + phosphorus pentoxide; potassium-tert-butoxide; sodium methylate; NaK. Incompatible with dinitrogen tetraoxide; fluorine; metals; triisopropylphosphine. Combustible when exposed to high heat. When heated to decomposition it emits toxic fumes of Cl⁻.

See also CHLORINATED HYDROCARBONS, ALI-PHATIC. For further information, see Vol. 3, No. 5 of DPIM Report.

CHJ599 HR: 3 CHLOROFORMAMIDINIUM CHLORIDE

CAS: 29671-92-9

mf: CH₄Cl2N₂

mw: 102.95

CIC(:NH)N+H₃Cl⁻

THR: Reaction with perchloric acid forms highly explosive products. When heated to decomposition it emits toxic fumes of Cl⁻ and NO_x. See also CHLORIDES.

CHJ625 HR: 3

CHLOROFORMAMIDINIUM NITRATE

CAS: 75524-40-2

mf: CH₃ClN₃O₃ mw: 140.51

THR: A powerful explosive and a strong oxidant. Mixtures with wet magnesium powder; powdered aluminum; or powdered iron ignite and then explode. Reacts violently with ammonia or amines. When heated to decomposition it emits toxic fumes of Cl^- and NO_x . See also NITRATES and EXPLOSIVES.

CHJ750 HR: 3 4-CHLORO-N-FURFURYL-5-SULFAMOYLAN-THRANILIC ACID

CAS: 54-31-9 NIOSH: CB 2625000

mf: $C_{12}H_{11}CIN_2O_5S$ mw: 330.76

SYNS:

AISEMIDE FUROSEDON
ALUZINE FUROSEMID
5-(AMINOSULFONYL)-4-CHLORO2-((2-FURNAYLMETHYL) FUROSEMIDE "MITA"

AMINO)BENZOIC ACID FURSEMID
BERONALD FURSEMIDE
CHLOR-N-(2-FURYLMETHYL)-5SULFAMYLANTHRANILSAEURE HYDRO-RAPID

SULFAMYLANTHRANILSAEURE HYDRO-RAPID
(GERMAN) KATLEX
4-CHLORO-N-(2-FURYLMETHYL)5-SULFAMOYLANTHRANILIC LASIX

LB 502 DESDEMIN LOWPSTRON DIURAL MACASIROOL DRYPTAL NICOROL ERROLON NCI-C55936 **EUTENSIN** PREFEMIN FRUSEMIDE **PROFEMIN** FRUSEMIN RADONNA FRUSID ROSEMIDE **FULSIX** SALIX **FULUVAMIDE** SEGURIL **FURANTHRIL** TRANSIT **FURANTHRYL** TROFURIT **FURANTRIL** UREX **FURESIS** UROSEMIDE

TOXICITY DATA: CODEN:

cyt-mus-ipr 312 µg/kg IJMRAQ 66,104,77 cyt-hrnn:leu 200 mg/L/24H MUREAV 66,69,79 cyt-ham:lng 1 g/L ATSUDG (4),41,80 cyt-ham:fbr 2 g/L ESKHA5 96,55,78 orl-rat TDLo:150 mg/kg (12-14D TJADAB 31,401,85

preg):TER

orl-mus TDLo: 12500 mg/kg SEIJBO 24,111,84

(6-15D preg):TER

ivn-man TDLo:29 mg/kg: NEJMAG 282,1413,70

EAR,KID

ivn-hmn TDLo: 1300 µg/kg: CVS AIMEAS 103,1,85

4

THR: An experimental carcinogen and neoplastigen. Very powerful oxidizer. See also CHROMIUM COMPOUNDS.

CMI500 HR: 3

CHROMITE (MINERAL)

CAS: 1308-31-2 NIOSH: GB 4000000

mf: Cr₂FeO₄ mw: 223.85

SYNS:

CHROME ORE CHROMITE ORE
CHROMITE IRON CHROMITE

TOXICITY DATA: CODEN:

mma-sat 2 mg/plate CRNGDP 3,1331,82 cyt-hmn:oth 500 mg/L BJCAAI 44,219,81 dni-ham:kdy 500 mg/L BJCAAI 44,219,81 oms-ham:kdy 500 mg/L BJCAAI 44,219,81 cyt-ham:ovr 5 mg/L BJCAAI 44,219,81 sce-ham:ovr 10 mg/L CRNGDP 3,1331,82

IARC Cancer Review: Animal Inadequate Evidence IMEMDT 23,205,80. Chromium and its compounds are on the Community Right To Know List.

OSHA PEL: CL 0.5 mg(Cr)/m³

ACGIH TLV: TWA 0.05 mg/m³ (ore processing); Human Carcinogen (ore processing)

THR: A human carcinogen. Human mutagenic data. See also CHROMIUM COMPOUNDS and IRON.

CMI750 HR: 3 CHROMIUM

CAS: 7440-47-3 NIOSH: GB 4200000

mf: Cr mw: 52.00

SYN: CHROME

TOXICITY DATA: CODEN:

ivn-rat TDLo: 2160 µg/kg/6W-I: JNCIAM 16,447,55

ETA

imp-rat TDLo: 1200 μg/kg/6W-I: JNCIAM 16,447,55

ETA

imp-rbt TDLo:75 mg/kg:ETA ZEKBAI 52,425,42 orl-hmn LDLo:71 mg/kg:GIT 34ZIAG -,176,69

IARC Cancer Review: Animal Inadequate Evidence IMEMDT 23,205,80. Reported in EPA TSCA Inventory. Chromium and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 1 mg/m³ ACGIH TLV: TWA 0.5 mg/m³

THR: Human poison by ingestion with gastrointestinal effects. An experimental tumorigen and suspected carcinogen. Powder will explode spontaneously in air. Ignites and is potentially explosive in atmospheres of carbon dioxide. Violent or explosive reaction when heated with ammonium nitrate. May ignite or react violently with bromine pentafluoride. Incandescent reaction with nitrogen oxide; sulfur dioxide. Incompatible with oxidants. See also CHROMIUM

COMPOUNDS. For further information, see Vol. 3, No. 3 of *DPIM Report*.

CMJ000 HR: 3

CHROMIUM ACETATE HYDRATE

CAS: 628-52-4 NIOSH: AG 3000000

mf: $C_4H_6O_4 \cdot Cr \cdot H_2O$ mw: 188.12

PROP: Red crystals.

SYNS:

ACETIC ACID, CHROMIUM (2+) CHROMIUM DIACETATE

SALT (8CI, 9CI) CHROMOUS ACETATE

CHROMIUM(2+) ACETATE CHROMOUS ACETATE MONOCHROMIUM(II) ACETATE HYDRATE

TOXICITY DATA: CODEN:

orl-rat LD50: 11260 mg/kg AIHAAP 30,470,69

Reported in EPA TSCA Inventory. Chromium and its compounds are on the Community Right To Know List.

OSHA PEL: CL 0.5 mg(Cr)/m³ ACGIH TLV: TWA 0.5 mg(Cr)/m³

THR: Mildly toxic by ingestion. The anhydrous acetate ignites spontaneously in air. See also CHROMIUM COMPOUNDS. When heated to decomposition it emits acrid smoke and irritating fumes.

CMJ250 HR: 3

CHROMIUM CHLORIDE

CAS: 10025-73-7 NIOSH: GB 5425000

mf: Cl_3Cr mw: 158.35

PROP: Bp: 1300° (subl).

SYNS:

CHROMIC CHLORIDE C.I. 77295

CHROMIUM(III) CHLORIDE (1:3) PURATRONIC CHROMIUM CHLO-

CHROMIUM CHLORIDE, ANHY- RIDE

DROUS TRICHLOROCHROMIUM

CHROMIUM TRICHLORIDE

TOXICITY DATA: CODEN:

pic-esc 500 μmol/L ENMDUM 6,59,84 cyt-hmn:oth 500 mg/L BJCAAI 44,219.81 dnd-rat-ipr 80 mg/kg CNREA8 45,1146,85 dni-mus:fbr 300 μmol/L JTEHD6 15,237,85 ce-ham:lng 39 mg/L CRNGDP 4,605,83 jrr-mus TDLo:44600 μg/kg (8D JTSCDR 1,1,76

preg):TER

ipr-mus TDLo: 59500 μg/kg (9D JTSCDR 1,1,76

preg): REP

scu-mus TDLo:450 mg/kg TJADAB 12,198,75

(1-17D preg): TER

skn-rat LDLo: 2 g/kg
ihl-mus LC50: 31500 μg/m³/2H
ipr-mus LD50: 434 mg/kg
scu-mus LDLo: 800 mg/kg
ivn-mus LDLo: 400 mg/kg
AQMOAC #70-15,70
AQMOAC #70-15,70

ivn-mus LD50:40 mg/kg 85GMAT -,39,82 skn-rbt LDLo:1 g/kg 85GMAT -,39,82 OSHA PEL: TWA 0.2 mg/m³

NIOSH REL: (To Coal Tar Products) TWA 0.1 mg/m³

DOT Classification: Flammable or Combustible; Label Flammable Liquid

THR: An experimental carcinogen and tumorigen. Mutagenic data. A human and experimental skin irritant. When heated to decomposition it emits acrid smoke and irritating fumes.

LCC000

HR: 1

LAVENDER ABSOLUTE

CAS: 8000-28-0

NIOSH: OF 6100000

PROP: Found in the flowers of Lavandula officinalis chaix. The main constituent is linally acetate. A dark green liquid prepared from alcoholic extract of a residue which is extracted from plant material using an organic solvent.

TOXICITY DATA:

CODEN:

skn-rbt 500 mg/24H MLD

FCTXAV 14,449,76

orl-rat LD50:4250 mg/kg

FCTXAV 14,449,76

THR: Mildly toxic by ingestion. A skin irritant. When heated to decomposition it emits acrid smoke and irritating fumes. See also 3,7-DIMETHYL-1,6-OCTADIEN-3-OL ACETATE.

LCD000

HR: 1

LAVENDER OIL

CAS: 8000-28-0

NIOSH: OF 6110000

PROP: Main constituent is linally acetate. Found in the plant Lavandulaofficinalif choix (Fam. Labiate). Prepared by steam distillation of the flowering stalks of the plant.

SYNS:

LAVENDEL OEL (GERMAN)

OIL OF LAVENDER

TOXICITY DATA:

CODEN:

skn-rbt 500 mg/24H MLD

FCTXAV 14,451,76

orl-rat LD50:9040 mg/kg

PHARAT 14,435,59

Reported in EPA TSCA Inventory.

THR: Mildly toxic by ingestion. A skin irritant. When heated to decomposition it emits acrid smoke and irritating fumes. See also 3,7-DIMETHYL-1,6-OCTADIEN-3-OL ACETATE.

LCE000

HR: 3

LD-813

CAS: 64083-05-2

NIOSH: OF 6730000

PROP: Commercial mixture of aromatic amines containing approx 40% MOCA.

TOXICITY DATA:

CODEN:

ori-rat TDLo:37 g/kg/2Y-C:CAR

TXAPA9 31,159,75

THR: An experimental carcinogen. When heated to decomposition it emits toxic fumes of NO_x . See also AROMATIC AMINES.

LCF000

HR: 3

LEAD

CAS: 7439-92-1

NIOSH: OF 7525000

af: Pb aw: 207.19

PROP: Bluish-gray, soft metal. Mp: 327.43°, bp: 1740°, d: 11.34 @ 20°/4°. vap press: 1 mm @ 973°.

SYNS:

C.I. 77575 C.I. PIGMENT METAL 4 OLOW (POLISH)

OMAHA OMAHA & GRANT

GLOVER

SI

LEAD FLAKE LEAD S2

SO

TOXICITY DATA: CODEN:

cyt-hmn-unr 50 μg/m³ cyt-rat-ihl 23 μg/m³/16W cyt-mky-orl 42 mg/kg/30W orl-rat TDLo: 790 mg/kg (MGN): REP MUREAV 147,301,85 GTPZAB 26(10),38,82

nky-orl 42 mg/kg/30W TOLED5 8,165,81 at TDLo:790 mg/kg AEHLAU 23,102,71

orl-rat TDLo:1140 mg/kg (14D

pre-21D post): REP

PHMCAA 20,201,78

orl-rat TDLo: 1100 mg/kg (1-22D

preg): TER ihl-rat TCLo: 10 mg/m³/24H FEPRA7 37,895,78

ZHPMAT 165,294.77

(1-21D preg): TER

(1-21D preg): 1ER orl-wmn TDLo: 450 mg/kg/6Y:

JAMAAP 237,2627,77

PNS:CNS

ihl-hmn TCLo: 10 μg/m³:GIT:

VRDEA5 (5),107,81

LIV

ipr-rat LDLo: 1000 mg/kg

EQSSDX 1,1,75 HBAMAK 4,1289,35

orl-pgn LDLo: 160 mg/kg HE

IARC Cancer Review: Animal Inadequate Evidence IMEMDT 23,325,80. Lead and its compounds are on the Community Right To Know List. Reported in EPA TSCA

OSHA PEL: TWA 0.05 mg(Pb)/m³ ACGIH TLV: TWA 0.15 mg(Pb)/m³

Inventory. EPA Genetic Toxicology Program.

NIOSH REL: TWA (Inorganic Lead) 0.10 mg(Pb)/m³

THR: Poison by ingestion. Moderately toxic by intraperitoneal route. It is a suspected carcinogen of the lungs and kidneys. Human systemic effects by ingestion and inhalation: loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pains, tremors, flaccid paralysis without anesthesia, hallucinations and distorted perceptions, muscle weakness, gastritis and liver changes. The major organ systems affected are the nervous system, blood system, and kidneys. Lead encephalopathy is accompanied by severe cerebral edema, increase in cerebral spinal fluid pressure, proliferation and swelling of endothelial cells in capillaries and arterioles, proliferation of glial cells, neuronal degeneration and areas of focal cortical necrosis in fatal cases. Experimental evidence now suggests that blood levels of lead below 10 µg/dl can have the effect of dimin-

2097 LEAD ACETATE LCG000

ishing the IQ scores of children. Low levels of lead impair neurotransmission and immune system function and may increase systolic blood pressure. Reversible kidney damage can occur from acute exposure. Chronic exposure can lead to irreversible vascular schlerosis, tubular cell atrophy, interstitial fibrosis, and glomerular sclerosis. Severe toxicity can cause sterility, abortion and neonatal mortality and morbidity. An experimental teratogen. Experimental reproductive effects. Human mutagenic data. Very heavy intoxication can sometimes be detected by formation of a dark line on the gum margins, the so-called "lead line."

When lead is ingested, much of it passes through the body unabsorbed, and is eliminated in the feces. The greater portion of the lead that is absorbed is caught by the liver and excreted, in part, in the bile. For this reason, larger amounts of lead are necessary to cause toxic effects by this route, and a longer period of exposure is usually necessary to produce symptoms. On the other hand, upon inhalation, absorption takes place easily from the respiratory tract and symptoms tend to develop more quickly. For industry, inhalation is much more important than is ingestion. For the general population, exposure to lead occurs from inhaled air, dust of various types, and food and water with an approximate 50/50 division between inhalation and ingestion routes. Lead occurs in water in either dissolved or particulate form. At low pH, lead is more easily dissolved. Chemical treatment to soften water increases the solubility of lead. Adults absorb about 5-15% of ingested lead and retain less than 5%. Children absorb about 50% and retain about 30%.

Lead produces a brittleness of the red blood cells so that they hemolyze with but slight trauma; the hemoglobin is not affected. Due to their increased fragility, the red cells are destroyed more rapidly in the body than is normal, producing an anemia which is rarely severe. The loss of circulating red cells stimulates the production of new young cells which, on entering the blood stream, are acted upon by the circulating lead, with resultant coagulation of their basophilic material. These cells after suitable staining, are recognized as "stippled cells." There is no uniformity of opinion regarding the effect of lead on the white blood cells.

In addition to its effect on the red blood cells, lead produces a damaging effect on the organs or tissues with which it comes in contact. No specific or characteristic lesion is produced. Autopsies in deaths attributed to lead poisoning and experimental work on animals have shown pathological lesions of the kidneys, liver, male gonads, nervous system, blood vessels and other tissues. None of these changes, however, has been found consistently. In cases of severe lead poisoning, the amount of lead found in the blood is frequently in excess of 0.07 mg per 100 cc of whole blood. The urinary lead excretion generally exceeds 0.1 mg per liter of urine.

Flammable in the form of dust when exposed to heat

or flame. Moderately explosive in the form of dust when exposed to heat or flame. Mixtures of hydrogen peroxide + trioxane explode on contact with lead. Rubber gloves containing lead may ignite in nitric acid. Violent reaction on ignition with chlorine trifluoride; concentrated hydrogen peroxide; ammonium nitrate (below 200°C with powdered lead); sodium acetylide (with powdered lead). Incompatible with NaN₃; Zr; disodium acetylide; oxidants. Can react vigorously with oxidizing materials. A common air contaminant. When heated to decomposition it emits highly toxic fumes of Pb. See also LEAD COMPOUNDS. For further information, see Vol. 1, No. 1 of DPIM Report.

LCG000 HR: 3

LEAD ACETATE

CAS: 301-04-2 NIOSH: AI 5250000

DOT: 1616

mf: C₄H₆O₄•Pb mw: 325.29

PROP: Trihydrate: colorless crystals or white granules or powder. Sltly acetic odor, slowly effloresces. D: 2.55, mp: 75° (when rapidly heated), decomp above 200°. Very sol in glycerol.

SYNS:

LEAD DIACETATE

ACETATE de PLOMB (FRENCH)

ACETIC ACID LEAD (2+) SALT

BLEIACETAT (GERMAN)

DIBASIC LEAD ACETATE

DIBASIC LEAD ACETATE

RCRA WASTE NUMBER U144

LEAD (2+) ACETATE

SALT OF SATURN

LEAD(II) ACETATE

SUGAR OF LEAD

TOXICITY DATA: CODEN: **MUTAEX 1.21.86** sin-smc 250 µmol/L cyt-hmn:lym 1 mmol/L/24H TXCYAC 10,67,78 mnt-rat-ipr 51800 µg/kg AEHLAU 40,144,85 JJIND8 67,1303,81 otr-rat: emb 200 mg/L oms-rat-ipr 10400 µg/kg AEHLAU 40,144,85 cyt-rat-unr 9 mg/kg/26W-C GISAAA 49(3),15,84 cvt-rat-ipr 51800 µg/kg AEHLAU 40.144.85 orl-rat TDLo:600 µg/kg (30D AJOGAH 115,1058,73 male): REP orl-rat TDLo: 1413 mg/kg (1-18D **ENVRAL 30,152,83** preg): TER ARTODN 41,125,78

orl-mus TDLo: 236 mg/kg (7-16D preg): TER
orl-rat TDLo: 900 mg/kg/60D-C: ENVRAL 24,391,81
NEO
orl-rat TD : 250 g/kg/47W-C: BJCAAI 16,283,62
ETA
orl-rat TD : 2430 mg/kg/23W-C: ENVRAL 24,391,81
ETA
orl-rat TD : 4605 mg/kg/44W-C: ENVRAL 24,391,81

ETA
orl-rat TD :7560 mg/kg/72W-C: ENVRAL 24,391,81
NEO

orl-rat TD:9150 mg/kg/44W-C: AJPAA4 50,571,67 NEO

orl-rat TD :218 g/kg/1Y-C:ETA BECTA6 23,464,79 orl-rat TD :138 g/kg/76W-C: TOPADD 13,50,85

2477 NICKEL NCW500

400

× ...

2,2-BIS(((3-PYRIDINYLCAR-

BURFOR

BONYL)OXY)METHYL)-1,3-

PROPANEDIYL ESTER of 3-

PYRIDINECARBOXYLIC ACID

CARDIOLIPOL

TINATE

PERYCIT

SK 1

PENTAERYTHRITOL TETRANICO-

TOXICITY DATA: CODEN: TOXICITY DATA: CODEN: UCDS** 4/29/69 skn-rbt 500 mg open MLD orl-rat TDLo:42 g/kg (35D pre): OYYAA2 14,755,77 UCDS** 4/29/69 orl-rat LD50:20 g/kg REP orl-rat TDLo: 45500 mg/kg (91D OYYAA2 14,853,77 Reported in EPA TSCA Inventory. male): REP orl-rat LD50:20 g/kg NIIRDN 6,546,82 THR: Mildly toxic by ingestion. A skin irritant. ipr-rat LD50:5000 mg/kg NIIRDN 6.546.82 scu-rat LD50:5000 mg/kg NIIRDN 6,546,82 NCV500 HR: 1 orl-mus LD50:20 g/kg NIIRDN 6,546,82 **NIAX TRIOL 6000** ipr-mus LD50:5000 mg/kg NIIRDN 6,546,82 scu-mus LD50:5000 mg/kg NIIRDN 6,546,82 CAS: 102395-10-8 NIOSH: QR 4600000 orl-dog LD50:5000 mg/kg NIIRDN 6,546,82 **TOXICITY DATA:** orl-rbt LD50:10 g/kg NIIRDN 6,546,82 CODEN: ipr-rbt LD50:5000 mg/kg **NIIRDN 6,546,82** skn-rbt 500 mg open MLD UCDS** 6/15/71 orl-rat LD50:57 g/kg UCDS** 6/15/71 THR: Mildly toxic by ingestion. Experimental reproductive THR: Mildly toxic by ingestion. A skin irritant. effects. When heated to decomposition it emits toxic fumes of NO.. See also ESTERS. NCW000 HR: 3 NIAZOL NCW500 HR: 3 CAS: 550-99-2 NIOSH: NJ 4375000 NICKEL mf: C₁₄H₁₄N₂•ClH mw: 246.76 CAS: 7440-02-0 NIOSH: QR 5950000 af: Ni aw: 58.71 SYNS: ALBALON LIQUIFILM 2-(1-NAPHTHYLMETHYL)-2-IM-PROP: A silvery-white, hard, malleable and ductile metal. CLERA IDAZOLINE HYDROCHLORIDE D: 8.90 @ 25°, vap press: 1 mm @ 1810°. Crystallizes COLDAN PRIVINE HYDROCHLORIDE PRIZOLE HYDROCHLORIDE 4.5-DIHYDRO-2-(1-NAPHTHALEas metallic cubes. Mp: 1455°, bp: 2730°. Stable in air at NYLMETHYL)-1H-IMIDAZOLE RHINANTIN room temp. MONOHYDROCHLORIDE RHINOPERD NAPHAZOLINE HYDROCHLORIDE SANORIN-SPOFA SYNS: NAPHCON STRICYLON C.I. 77775 **NICKEL SPONGE** VASOCON NAPHCON FORTE Ni 270 Ni 0901-S 2-(1-NAPHTHYLMETHYL)IMID-NICKEL 270 Ni 4303T AZOLINE HYDROCHLORIDE NICKEL (DUST) NP 2 NICKEL (ITALIAN) RANEY ALLOY CODEN: **TOXICITY DATA: NICKEL PARTICLES** RANEY NICKEL Foretry ED50:50 mg/kg JPETAB 86,284,46 12 to a LD50:325 mg/kg JPETAB 86,284,46 **TOXICITY DATA:** CODEN: avn-rat LD50:6 mg/kg JPETAB 113,341,55 otr-ham: kdy 400 mg/L IAPUDO 53,193,84 scu-mus LD50:170 mg/kg JPETAB 86,280,46 otr-ham: emb 5 µmol/L TOXID9 1,132,81 ivn-mus LD50: 16500 µg/kg JPETAB 113,341,55 orl-rat TDLo: 158 mg/kg AEHLAU 23,102,71 JPETAB 86,284,46 scu-rbt LD50:950 mg/kg (MGN): TER ivn-rbt LD50:800 µg/kg JPETAB 86,284,46 scu-rat TDLo: 3000 mg/kg/6W-I: **JNCIAM 16,55,55** ims-rbt LD50:950 µg/kg JPETAB 86,284,46 ETA ims-rat TDLo:56 mg/kg:CAR IAPUDO 53,127,84 THR: Poison by intraperitoneal, subcutaneous, intravenous ipl-rat TDLo: 100 mg/kg/21W-I: PWPSA8 16,150,73 and intramuscular routes. An FDA over the counter and proprietary drug. When heated to decomposition it emits **AEHLAU 5,445,62** par-rat TDLo:40 mg/kg/52W-I: very toxic fumes of NO_x and HCl. ETA,TER imp-rat TDLo: 250 mg/kg: CAR JNCIAM 16.55.55 NCIUS* PH 43-64ims-mus TDLo: 200 mg/kg: NEO NCW300 HR: 1 886,SEPT,70 NICERITROL imp-rbt TDLo: 165 mg/kg/2Y-I: JNCIAM 16,55,55 CAS: 5868-05-3 NIOSH: QT 1980000 NEO, TER ihl-gpg TCLo: 15 mg/m³/91W-I: AMPLAO 65,600,58 mw: 556.57 mf: C₂₉H₂₄N₄O₈ ETA PROP: Crystals. Mp: 160-164°. ims-ham TDLo: 200 mg/kg/21W-PWPSA8 14,68,71 I:ETA SYNS: ims-rat TD:58 mg/kg:ETA PAACA3 17,11,76

imp-rat TD:23 mg/kg:ETA

NEO

NEO

ims-rat TD: 125 mg/kg/13W-I:

ims-mus TD: 800 mg/kg/13W-I:

JNCIAM 16,55,55

NCIUS* PH 43-64-

NCIUS* PH 43-64-

886,JUL,68

886,JUL,68

ims-rat TD:90 mg/kg/18W-I:	NCIUS* PH 43-64-
ETA	886,AUG,69
ims-rat TD:889 μg/kg:ETA	JPTLAS 97,375,69
ipl-rat TD :1250 mg/kg/17W-I:	TRBMAV 10,167,52
ETA	
ipl-rat TD:125 mg/kg/21W-I:	PWPSA8 16,150,73
ETA	
ims-rat TD: 200 mg/kg/21W-I:	PWPSA8 14,68,71
NEO	
ims-rat TD:1 g/kg/17W-I:CAR	PAACA3 9,28,68
itr-rat LDLo: 12 mg/kg	NTIS** AEC-TR-6710
ivn-mus LDLo:50 mg/kg	FATOAO 23,549,60
ivn-dog LDLo:10 mg/kg	14CYAT 2,1120,63
scu-rat LDLo: 12500 μg/kg	NTIS** PB158-508
ipr-rbt LDLo:7 mg/kg	NTIS** PB158-508
scu-rbt LDLo:7500 μg/kg	NTIS** PB158-508
orl-gpg LDLo:5 mg/kg	AMPMAR 25,247,64

IARC Cancer Review: Animal Inadequate Evidence 2.126.73: Animal Sufficient Evidence IMEMDT 11,75,76. Reported in EPA TSCA Inventory. Community Right To Know List. EPA Extremely Hazardous Substances List.

OSHA PEL: TWA 1 mg(Ni)/m³ ACGIH TLV: TWA 1 mg/m³

NIOSH REL: (Inorganic Nickel) TWA 0.015 mg(Ni)/m³

THR: Poison by ingestion, intratracheal, intraperitoneal, subcutaneous and intravenous routes. An experimental carcinogen, neoplastigen, tumorigen, and teratogen. Experimental reproductive effects. Ingestion of soluble salts causes nausea, vomiting, diarrhea. Mutagenic data. Hypersensitivity to nickel is common and can cause allergic contact dermatitis, pulmonary asthma, conjunctivitis, and inflammatory reactions around nickel-containing medical implants and prostheses. Powders may ignite spontaneously in air. Reacts violently with F₂; NH₄NO₃; hydrazine; NH₃; (H₂ + dioxane); performic acid; P; Se; S; (Ti + KClO₃). Incompatible with oxidants (e.g., bromine pentafluoride; peroxyformic acid; potassium perchlorate; chlorine; nitryl fluoride; ammonium nitrate). Raney-nickel catalysts may initiate hazardous reactions with ethylene + aluminum chloride; p-dioxane; hydrogen; hydrogen + oxygen; magnesium silicate; methanol; organic solvents + heat; sulfur compounds. Nickel catalysts have caused many industrial accidents. For further information, see Vol. 3, No. 3 of DPIM Report.

NCX000 HR: 3

NICKEL(II) ACETATE (1:2)

CAS: 373-02-4 NIOSH: QR 6125000

 $mf: C_4H_6O_4 \cdot Ni$ mw: 176.81

PROP: Green prisms. Mp: decomp, d: 1.798.

SYNS:

ACETIC ACID, NICKEL(2+) SALT NICKELOUS ACETATE

TOXICITY DATA:

CODEN: pic-esc 160 µmol/L ENMUDM 6,59,84 dns-rat-ipr 129 µmol/kg/5D-I **CRNGDP** 6,1819,85

IAPUDO 53.193.84 otr-ham:kdy 225 mg/L **ADTEAS 5,51,72** ivn-ham TDLo:10 mg/kg (8D preg): REP

ims-rat TDLo: 420 mg/kg/47W-I: NCIUS* PH 43-64-886,JUL,68 **NEO** imp-rat TDLo:95 mg/kg/78W-C: PAACA3 5,50,64

ETA

CNREA8 36,1744,76 ipr-mus TDLo:360 mg/kg/8W-I:

NEO

ims-rat TD: 225 mg/kg/46W-I: NCIUS* PH 43-64-**ETA** 886,AUG.69 orl-rat LD50:350 mg/kg PWPSA8 11,39,68 ipr-rat LD50:23 mg/kg PWPSA8 11,39,68 orl-mus LD50:410 mg/kg PWPSA8 11,39,68 ipr-mus LD50:32 mg/kg PWPSA8 11,39,68 scu-gpg LDLo:20 mg/kg **JOHYAY 8,565,08**

Nickel and its compounds are on the Community Right To Know List. Reported in EPA TSCA Inventory.

OSHA PEL: TWA 1 mg(Ni)/m³ ACGIH TLV: TWA 0.1 mg(Ni)/m³

NIOSH REL: (Inorganic Nickel) TWA 0.015 mg(Ni)/m³

THR: Poison by ingestion, intraperitoneal and subcutaneous routes. An experimental neoplastigen and tumorigen. Experimental reproductive effects. Mutagenic data. When heated to decomposition it emits irritating fumes. See also NICKEL COMPOUNDS.

NCX500 HR: 3

NICKEL ACETATE TETRAHYDRATE

CAS: 6018-89-9 NIOSH: QR 6126000

mf: C₄H₆O₄•Ni•4H₂O mw: 248.89

TOXICITY DATA: CODEN:

MUREAV 68,337,79 cyt-mus:mmr 100 µmol/L RCOCB8 30,133,80 ipr-mus LD50:45700 μg/kg

Nickel and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 1 mg(Ni)/m³ ACGIH TLV: TWA 0.1 mg(Ni)/m³

NIOSH REL: (Inorganic Nickel) TWA 0.015 mg(Ni)/m³

THR: Poison by intraperitoneal route. Mutagenic data. When heated to decomposition it emits acrid smoke and irritating fumes. See also NICKEL(II) ACETATE and NICKEL COMPOUNDS.

NCY000 HR: D

NICKEL ALLOY, Ni,Be

CAS: 37227-61-5 NIOSH: QR 6126300

SYN: BERYLLIUM-NICKEL ALLOY

IARC Cancer Review: Animal Inadequate Evidence IMEMDT 23,143,80. Nickel and its compounds as well as beryllium and its compounds are on the Community Right To Know List.

HR: 3

THR: Mutagenic data.

ZBA500 ZIMELIDINE HR: 3

HR: 3

CAS: 56775-88-3 NIOSH: UC 6555000

 $mf: C_{16}H_{17}BrN_2$ mw: 317.26

SYNS:

2. (Z)-3-(4'-BROMOPHENYL)-3-(3''PYRIDYL)DIMETHYLALLYLAMINE
ALLYLAMINE
ALLYLAMINE
3-(4-BROMOPHENYL)-N,N-DIMETHYL-3-(3-PYRIDINYL)-2PROPEN-1-AMINE

3-(p-BROMOPHENYL)-N,N-DI-METHYL-3-(3-PYRIDYL) cis-ZIMELIDINE ALLYLAMINE. (Z)-ZIMELIDINE

TOXICITY DATA: CODEN: orl-wmn TDLo:56 mg/kg/14D: BMJOAE 285,1009,82

GIT,CNS
orl-rat LD50:900 mg/kg
ivn-rat LD50:50 mg/kg
orl-mus LD50:800 mg/kg
ivn-mus LD50:60 mg/kg
DRUGAY 24,169,82
DRUGAY 24,169,82
DRUGAY 24,169,82
DRUGAY 24,169,82

THR: Poison by intravenous route. Moderately toxic by ingestion. Human systemic effects by ingestion: muscle weakness, headache and nausea. When heated to decomposition it emits toxic fumes of Br⁻ and NO_r.

ZBA525
ZIMELIDINE DIHYDROCHLORIDE

CAS: 60525-15-7 NIOSH: UC 6555200

mf: C₁₆H₁₇BrN₂•2ClH mw: 356.70

SYNS:

是一个人,这种是一个人,也是一个人,他们也是一个人,他们也是一个人,他们也是一个人,他们也是一个人,他们也是一个人,他们是一个人,他们也是一个人,他们也是一个人, 第二章 是一个人,他们也是一个人,他们也是一个人,他们也是一个人,他们也是一个人,他们也是一个人,他们也是一个人,他们也是一个人,他们也是一个人,他们也是一个人

(Z)-3-(4-BROMOPHENYL)-N,N-DI-METHYL-3-(3-PYRIDINYL)-2-PROPEN-1-AMINE DIHYDRO-

CHLORIDE

ivn-rbt LD50:50800 µg/kg

TOXICITY DATA: CODEN: orl-rat TDLo: 120 mg/kg (6-17D KSRNAM 17,1833,83 preg): REP orl-rat TDLo: 12 mg/kg (6-17D KSRNAM 17,1833,83 preg): REP orl-rat LD50:844 mg/kg APSXAS 20,295,83 ipr-rat LD50:99800 µg/kg APSXAS 20,295,83 scu-rat LD50:227 mg/kg APSXAS 20,295,83 KSRNAM 17,1833,83 ivn-rat LD50:45800 µg/kg orl-mus LD50:341 mg/kg KSRNAM 17,1833,83 ipr-mus LD50:84400 μg/kg APSXAS 20,295,83 scu-mus LD50:154 mg/kg KSRNAM 17,1833,83 ivn-mus LD50:27700 KSRNAM 17,1833,83 μg/kg orl-dog LD50:271 mg/kg KSRNAM 17,1833,83 ivn-dog LD50:57 mg/kg KSRNAM 17,1833,83 orl-cat LDLo: 80 mg/kg APSXAS 20,295,83 orl-rbt LD50:300 mg/kg KSRNAM 17,1833,83

THR: Poison by ingestion, subcutaneous, intravenous and intraperitoneal routes. Experimental reproductive effects.

KSRNAM 17,1833,83

When heated to decomposition it emits toxic fumes of Br⁻, NO_r and HCl. See also ZIMELIDINE.

ZBJ000

ZINCCAS: 7440-66-6 NIOSH: ZG 8600000

DOT: 1383/1436 af: Zn aw: 65.37

PROP: Bluish-white, lustrous, metallic element. Mp: 419.8°, bp: 908°, d: 7.14 @ 25°, vap press: 1 mm @ 487°. Stable in dry air.

SYNS:

BLUE POWDER PASCO
C.I. 77945 ZINC DUST
C.I. PIGMENT BLACK 16 ZINC POWDER

C.I. PIGMENT METAL 6 ZINC, POWDER OR DUST. NON-EMANAY ZINC DUST PYROPHORIC (DOT)

GRANULAR ZINC ZINC, POWDER OR DUST, PYRO-JASAD PHORIC (DOT)

MERRILLITE

TOXICITY DATA: CODEN:

skn-hmn 300 µg/3D-I:MLD 85DKA8 -,127,77 ihl-hmn TCLo:124 mg/m³/50M: AHYGAJ 72,358,10

PUL, SKN

Zinc and its compounds are on the Community Right To Know List. Reported in EPA TSCA Inventory. EPA Genetic Toxicology Program.

DOT Classification: Flammable Solid; Label: Dangerous When Wet, non-pyrophoric; Flammable Solid; Label: Spontaneously Combustible, pyrophoric

THR: Human systemic effects by ingestion: cough, dyspnea and sweating. A human skin irritant. Pure zinc powder, dust, fume is relatively non-toxic to humans by inhalation. The difficulty arises from oxidation of zinc fumes immediately prior to inhalation or presence of impurities such as Cd, Sb, As, Pb. Inhalation may cause sweet taste, throat dryness, cough, weakness, generalized aches, chills, fever, nausea, vomiting.

Flammable in the form of dust when exposed to heat or flame. May ignite spontaneously in air when dry. Explosive in the form of dust when reacted with acids. Incompatible with NH₄NO₃; BaO₂; Ba(NO₃)₂; Cd; CS₂; chlorates; Cl₂; ClF₃; CrO₃; (ethyl acetoacetate + tribromoneopentyl alcohol); F₂; hydrazine mononitrate; hydroxylamine; $Pb(N_3)_2$; $(Mg + Ba(NO_3)_2 + BaO_2)$; $MnCl_2$; HNO_3 ; performic acid; KClO₃; KNO₃; K₂O₂; Se; NaClO₃; Na₂O₂; S; Te; H₂O; (NH₄)₂S; As₂O₃; CS₂; CaCl₂; NaOH; chlorinated rubber; catalytic metals; halocarbons; o-nitroanisole; nitrobenzene; non-metals; oxidants; paint primer base; pentacarbonyliron; transition metal halides; seleninyl bromide. To fight fire, use special mixtures of dry chemical. When heated to decomposition it emits toxic fumes of ZnO. See also ZINC COMPOUNDS. For further information, see Vol. 1, No. 7 of DPIM Report.

RECORD OF COMMUNICATION (214) 298-6171	(Record of Item Checked Below) x Phone CallDiscussionField ConferenceOther(Specify)	d Trip	
TO: Paul Cooper Environmental Quality Specialist, Texas Water Commission, Duncanville, Texas	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/30/89	
		Time: 3:15 PM	
SUBJECT: G. M. Assembly	SUBJECT: G. M. Assembly - PA (TXD008018004)		
SUMMARY OF COMMUNICATION	I		
He reviews the site for	the TWC since last summer. (One 5-1	hour site visit,	
he was new at the TWC at	the time).		
The TWC is the only agen	cy issuing permits for solid hazardo	ous waste. The	
RCRA Parts A and B are t	he only permits the TWC issue. The	site is a	
90 day generator and doe	s not need a permit.		
He does not recall any w	aste spills at the site (either acc	idental, or from	
routine site operations)	. There have been product spills.		
There are approximately 2,000 employees at the site.			
He does not recall each of the SWMUs which handle the wastes from the			
source to where it leave	s the site, but the waste containmer	nt system	
would prevent any routin	e spills from releasing to environme	ent ("the	
containment system is as	good as any you will find in the ir	ndustry").	
The TWC District office file is unofficial (official file is in Austin).			
The District office site file should be as complete as the Austin TWC file.			
It is TWC policy that anything put into the Austin file is photocopied			
and the copy sent to the District office file.			
CONCLUSIONS, ACTION TAKEN OR REQUIRED			
INFORMATION COPIES TO:			

EPA FORM 1300-6 (7-72)

Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.



Chevrolet Pontlac Canada Group
Arlington Plant
General Motors Corporation
2525 East Abram Street
Arlington, Texas 76010-1390

86-PE-116

September 16, 1986

Mr. Minor Hibbs Texas Water Commission P. O. Box 13087 Capitol Station Austin, Texas 78711

RE: Notification of the Executive Director

Generator: General Motors, CPC Division

Address: 2525 E. Abram Street

Arlington, Texas 76010

TWC Registration: 30347

EPA I.D. Number: TXD008018004

This letter and the supporting attachments is to serve as notification to the Executive Director of the following actions:

- 1. Intent to close our existing 90-day drum storage area.
- 2. Submit our closure plan for the activities leading to the closure of our 90-day drum storage area.
- 3. Intent to construct a new 90-day waste storage area.

Action 1, Notification of Closure:

It is our intent to close our existing hazardous drum storage area which now operates under the Accumulation Time provision of TAC 335.69.

Action 2, Closure Plan:

The plan is attached hereto.

Action 3, Construction Intent:

This is to notify the Executive Director of our intent to construct a drum storage area which will operate under the requirements for Accumulation Time, TAC 335.69. The new proposed drum storage area will replace the drum storage area mentioned in Action 2. The proposed start of construction is to be October 1, 1986, finished October 31, 1986. See Attachment A-1.

Questions concerning the notification actions and closure action should be directed to the writer at 817-649-6350.

Kent Moon

Environmental Engineer

Attachment

cc: Tim Sewell

Texas Water Commission 203 James Collins Boulevard Duncanville, Texas 75116-4818

ACTION 2 DRUM STORAGE AREA CLOSURE PLAN

GENERAL MOTORS CORPORATION CPC ARLINGTON

SEPTEMBER, 1986

CLOSURE PLAN

A. FACILITY INFORMATION

Hazardous and non-hazardous waste materials that result from plant operations are accumulated and stored in 55-gallon drums or lugger boxes in a Hazardous Waste Storage Facility prior to being sent off-site to approved recycling or disposal facility. These materials consist of paint sludges, waste oils and greases, waste plastics, salt bath sludge, waste paint and thinner, and asbestos insulation. The EPA Waste Identification Number and Texas Waste Code of these wastes are as follows:

Waste	EPA ID Number	Texas Waste Code
Paint Sludge	D004, D008, +	950110
Waste Oil & Grease	Non-Hazardous	210450
Waste Plastics	D001	980270
Salt Bath Sludge	D002, D007	970320
Waste Paint & Thinner	D001	910110
Asbestos Insulation	Non-Hazardous	179390

The facility now operates under the Accumulation Time Storage exclusion of Texas Administrative Code Section 335.69 and the Wastewater Treatment Unit exclusion of Section 335.2(f).

An estimate of the maximum waste inventory in the storage facility is one thousand (1,000) 55-gallon drums. The normal inventory of combined materials fluctuates between 50-250 drums. See Attachment A-1.

B. STORAGE AREA CLEANING

The drums of waste material currently stored will be transferred to a new on-site drum storage area and/or transported for disposal to a properly licensed hazardous waste facility. The storage area base will then be cleaned with a high temperature steam 5% alkali industrial cleaning solution. The residue will be collected for subsequent disposal in 55-gallon drums. Any surface drains will be closed to prevent leakage into the existing trade waste sewer system.

B. STORAGE AREA CLEANING (Continued)

Samples of the cleaning solution residue will be collected and analyzed for hazardous waste as outlined in Industrial 335.62(2) of the Texas Management Regulations (40 CFR 261, Subpart C) and will include the following parameters: ignitability, corrosivity, EP toxicity (all metals listed in Table 1, Part 261.24), etc. If these analyses indicate that the residue exhibits a hazardous waste characteristic not solely attributable to the cleaning solution used, additional cleaning will be performed until the residue analyses indicate a level of concentration below those parameters specified in 40 CFR 261, Subpart C. cleaning residue will be disposed of at properly licensed facilities consistent with the analytical results of the samples.

The cleaning contractor will comply with the applicable Federal, State and local laws and regulations for the handling, transportation and disposal of the materials.

The contractor will be prepared to contain any spills that might occur during these operations and will recover any spills, residuals, and clean-up materials from any spills which might occur. This material shall be recovered and placed in an appropriate container.

Disposal of hazardous waste will be at a licensed hazardous waste disposal facility or facilities, where the materials will be disposed of in compliance with applicable Federal and State Regulations.

C. DECONTAMINATION OF EQUIPMENT

The equipment used during closure, which may be brooms, pumps, and hoses, will be decontaminated by washing with the cleaning solution and then a water rinse or disposed of in compliance with applicable Federal and State regulations.

Material cleaned from the equipment is estimated to be less than 55 gallons and will be disposed of with the cleaning residue. All equipment cleaning will be performed on the storage area base.

D. IMPLEMENTATION SCHEDULE FOR CLOSURE

The following proposed closure schedule will be used in implementing the procedures outlined in Sections B, C and E of this plan.

PROPOSED CLOSURE SCHEDULE

Task	Begin Date	Complete Date
Receive approval of the Closure Plan from the TWC		
Remove containers from storage area	11-03-86	11-06-86
Clean storage area	11-07-86	11-10-86
Collect and analyze residue samples	11-10-86	11-20-86
If necessary, perform additional cleaning	11-21-86	11-22-86
Decontaminate equipment	11-22-86	11-22-86
Closure certification	11-03-86	11-22-86

E. CLOSURE CERTIFICATION

To ensure that the closure of the facilities are completed as outlined in the closure plan, four (4) inspections of the operations by an Independent Registered Professional Engineer are anticipated.

The following certifications will be completed following closure.

OWNER CERTIFICATION OF CLOSURE

Ι,	,
(Owner or Opera	tor)
of General Motors Assembly Plan	t, 2525 E. Abram Stree
Arlington, Texas, hereby state and	
my knowledge and belief, the hazard	
have been closed in accordance with	
and that closure was completed on th	
19 .	
	•
Signature	Date
Ti+1e	

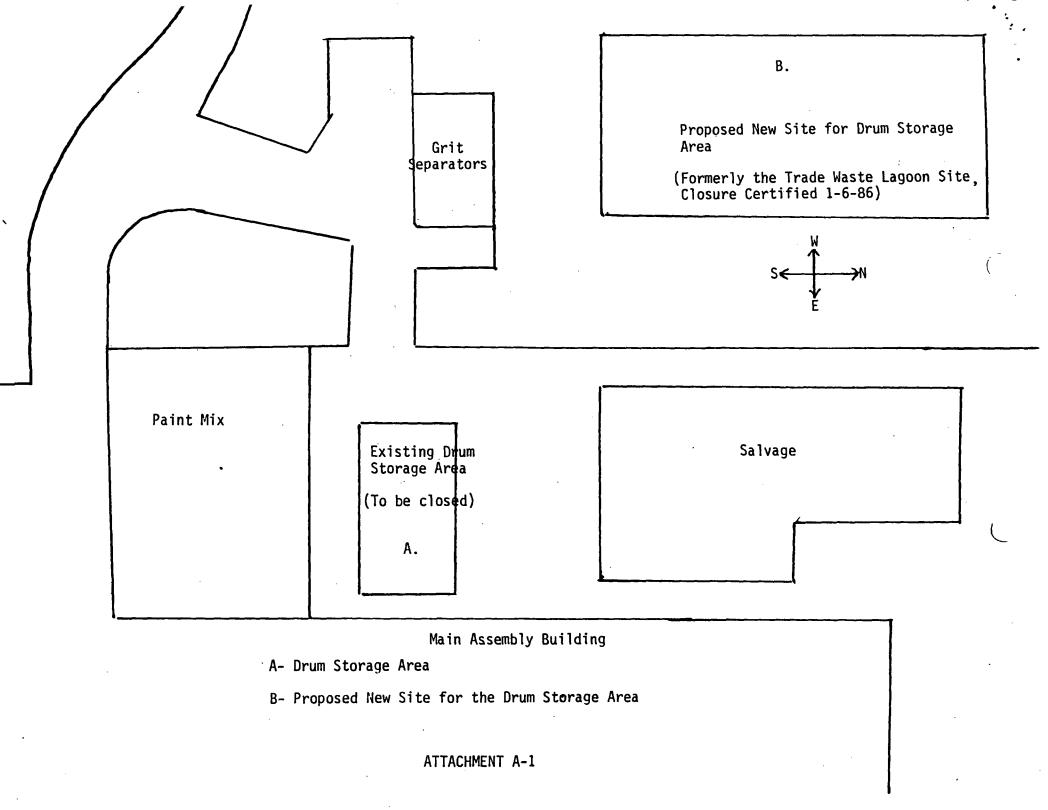
INDEPENDENT PROFESSIONAL ENGINEER CERTIFICATION OF CLOSURE

I,	•
(Name)	
a Registered Professional Enginee the best of my knowledge and bell Professional Engineer Closure Ceprior closure activities at the Arlington, Texas; and that I have the aforementioned facility, and storage facilities have been perapproved closure plan.	lief, that I have verified that rtificates were issued for all General Motors Assembly Plant, we made visual inspection(s) of closure of the hazardous waste
Signature	Date
PE License Number	For State of
·	
Business Add	iress
	. •
City/State/Zi	ip Code
Business Telephone (W	ith Area Code)

F. CLOSURE COST ESTIMATE

1.	Removal and disposal of containers (5 truck loads @ \$2,500/truck))	\$	12,500
2.	Clean storage area concrete base	•	15,000 ¹
3.	Sampling and analysis of residues		
	Sampling costs 4 hrs. @ \$35/hr.		140
	Analysis costs 4 to 8 samples @ \$600/sample	2,400 -	4,800
	Sub-Total C	2,540 -	4,940
4.	Decontamination of equipment		150
5.	Removal and disposal of cleaning residue (20 drums @ \$100/drum)		2,000
6.	Professional certification		
	Inspection and certification by a Professional Engineer (16 hrs. @ \$60/hr. 5 hrs. @ \$40/hr.)		1,160
	Administrative costs (6 hrs. @ \$50/hr. 4 hrs. @ \$20/hr.)	·	380
	Sub-Total F		2,540
	Total A to F	33,730 -	36,130 ¹

¹ Does not include cost of additional cleaning as a result of laboratory analysis results.



TEXAS WATER COMMISSION

Paul Hopkins, Chairman Ralph Roming, Commissioner John O. Houchins, Commissioner



September 26, 1986

Larry R. Soward, Executive Director

Mary Ann Hefner, Chief Clerk James K. Rourke, Jr., General Counsel



Mr. Gary Giles General Motors Corporation 2525 East Abram Street Arlington, Texas 76010

Attn.: Kent Moon

Re: TWC Industrial Solid Waste Registration No. 30347
Hazardous Waste Permit Application No. 10411
Full Facility Closure - Affidavit of Exclusion

Dear Mr. Giles:

We have reviewed your letter dated March 13, 1986 transmitting the certifications from the owner/operator that the drum storage area has been closed in accordance with the closure plan approved April 9, 1985. This transmittal, in addition to prior correspondence, completed the requirements for full facility closure for the drum storage area and the equalization lagoon. Our evaluation indicates that the drum storage area and equalization lagoon have been properly certified as closed in accordance with the approved closure plans. We will now resume processing your Affidavit of Exclusion from hazardous waste permitting requirements.

Also, we would like to inform you that recent correspondence from the U.S. Environmental Protection Agency (EPA) has clarified their position on the applicability of 40 CFR Part 264, Subpart F ground-water monitoring requirements to regulated units which close in accordance with the interim status closure requirements (see enclosed correspondence). The correspondence from EPA indicates that "you may be required, depending on the extent of contamination that remains after Part 265 closure, to undertake additional activities at a later date to come into compliance with applicable Part 264 ground-water monitoring and corrective action standards. The final test of whether additional activities will be required is whether the closed unit would have had additional Part 264 ground-water monitoring and corrective action obligation had it closed pursuant to a permit (recall that §3005(i) imposes the same Subpart F requirement on interim status units that they would have had if they had been permitted)."

Therefore, "where the applicant can demonstrate that he has already met the Part 264 'removal or decontamination' standard, no outstanding Part 264 Subpart F requirements would be deemed applicable under \$3005(i), and, thus, the Agency would not compel additional activities through a post-closure permit."

Mr. Gary Giles September 26, 1986 Page 2

Should you have any questions, please contact Rex G. McDonnell III of my staff at AC512/463-8174.

Sincerely,

Minor Brooks Hibbs, Chief

Permits Section

Hazardous and Solid Waste Division

RGM:nlf

Vcc: Tim Sewell, TWC District 4 Office - Duncanville



DATE: January 14, 1986

Texas Water Commission

INTEROFFICE MEMORANDUM

HAZARDOUS AND SCIED
WASTE DIVISION

TO

Bill Brown, Field Operations Liaison.

Hazardous and Solid Waste Division

THRU

FROM

R. L. Lauderdale, Engineer, District 4

SUBJECT:

General Motors Corporation - Arlington, Texas

Registration No. 30347

On December 19, 1985, the writer contacted Kent Moon, Environmental Engineer, and conducted an annual industrial waste compliance inspection of subject facility.

General Motors Corporation of Arlington paints and assembles automobiles to finished units.

All hazardous wastes except paint sludges are collected in drums and stored outside in a diked and fenced area. Drummed waste is sent to Chemical Waste Management, Lake Charles, Louisiana or Lone Mountain, Waynoke, Oklahoma for disposal. Paint thinner is shipped to Ramsey Chemical Company in Valdosa, Georgia for recycling.

Wastewater from paint booth waterfalls is generated at three paint lines. The wastewater is collected in a 40,000-gallon above-ground metal separator tank where solids are settled out. The paint sludge is collected in portable containers which are emptied into 30-cubic yard dumpsters. The supernatant liquid is pumped to a new physical, chemical waste treatment plant. Area around the separator tank is diked and any spillage is collected by a grit separator, thence is pumped to the new wastewater plant.

Portable containers also collect sludge and grit from the separators and thence deposit into 30-cubic yard dumpsters for disposal at permitted sites.

At the new wastewater plant, sludge and filter backwash cake are collected in 30-cubic yard roll-off dumpsters also from off-site disposal. Treated wastewater effluent from new plant is discharged to the sanitary sewerage system.

Closure plans have been submitted for the drum storage area and surface impoundment which has now been replaced by new wastewater plant. Drum storage area was certified closed June 28, 1985 by consulting engineer. The storage area was free of cracks and surface was clean.

General Motors Corporation - Arlington, Texas Registration No. 30347 Page 2 January 14, 1986

Closure of the surface impoundment was about complete at inspection date. Backfill material was satisfactory. Consulting engineer will submit certification of closure January 1986 to central office.

This is reported for your information.

RLL:jc

APPROVED SIGNED R. J. Fanderda Ce

Ref. 27

Texas Water Commission

INTEROFFICE MEMORANDUM

TO : Files DATE: 10/21/88

THRU : Ernest W. Heyer, Chief, Program Services Unit,

Field Operations Division

FROM : Paul Cooper, Environmental Quality Specialist, District 4

SUBJECT: General Motors Corporation - Arlington, Texas

SW Registration No. 30347 CEI Inspection, 9/23/88

On September 23, 1988, the writer contacted Paul Caigoy, Safety Coordinator, and conducted an industrial solid waste compliance evaluation inspection.

The referenced facility paints and assembles automobile components into finished products. The following is a description of wastes that are generated at this site:

- 1. Approximately 7,800 gallons of waste oil (Waste #008) is generated annually and manifested to LaFarge Corporation in Fredonia, Kansas.
- Paint sludge (Waste #011) is generated at a grit separator. The grit separator is the first stage of pretreatment of the facility's wastewater. The facility's wastewater consists of spent zinc phosphate solution used in the surface pretreatment of metal automobile parts, and washdown water from the paint booth and various other machinery. Approximately 406 tons of paint sludge are generated annually and manifested to USPCI in Waynoka, Oklahoma.
- 3. Sodium hydroxide (Waste #012) is used to dissolve paint overspray on the car conveyor racks. Approximately 60,950 pounds are manifested to USPCI each year.
- 4. Plastics (Waste #014) is generated from excess calking sealer applied to the joints on the automobiles. Approximately 78 tons are manifested to USPCI each year.
- 5. Paint thinner (Waste #015), generated from the cleaning of paint lines, is stored in two separate 12,000-gallon tanks (Waste Management Facility #02). One tank contains paint thinner too concentrated with paint to be reclaimed and is manifested to LaFarge Corporation. Reclaimable paint thinner is accumulated in the second tank and is manifested to Gibralter Chemical Recyclers in Winona, Texas. Approximately 62,191 gallons are generated each year.

General Motors Corporation - Arlington, Texas Registration No. 30347 Page 2 October 21, 1988

- 6. Paint stripping sludge (Waste #016) is spent chlorinated solvent used to remove off-specification paint from the automobiles.

 Approximately 4 drums per year are manifested to LaFarge Corporation.
- 7. In 1987, 48 cubic yards of asbestos insulation (Waste #018) were manifested to Crow and Son's Landfill in Fort Worth, Texas.
- 9. Empty containers (Waste #020) are not a waste. They are cleaned on-site and sold for recovery.
- 10. Contaminated chemical containers (Waste #021) that cannot be cleaned on-site are crushed and manifested to Enzco in Eldorado, Arkansas. Approximately 257 cubic yards are generated each year.
- 11. Antifreeze (Waste #022) is sold for recovery.

Note that no significant violations of the Texas Hazardous and Solid Waste Regulations were alleged during the inspection.

OTHER AREAS OF CONCERN

The company has submitted a Part "A" Application for two hazardous waste management units, a drum storage area, and an equalization lagoon. Texas Department of Water Resources approved the lagoon closure plan on February 20, 1985. The drum storage closure certification was submitted on October 4, 1985 and the lagoon closure certification was submitted on January 10, 1986. In correspondence of September 26, 1986 from TWC Permits Section, this agency agreed to resume processing the company's Affidavit of Exclusion which was submitted February 14, 1986. The district files do not reflect that the Affidavit of Exclusion has been processed to date. It is recommended that the Affidavit of Exclusion review be completed and the company's Part "A" be withdrawn.

PC:jc

APPROVED_	Ob	<i>5</i>	SIGNED	Paul	Cooper	
_						

	· · · · · · · · · · · · · · · · · · ·	
RECORD OF COMMUNICATION	(Record of Item Checked Below Phone CallDiscussionF	w) ield Trip
(214) 298-6171	ConferenceOther(Specify)	
TO: Tim Sewell Environmental Quality Specialist, Texas War Commission, Duncanvi Texas	ter FII My drologist	Date: 5/3//89 Time: ///5AM
	sembly-PA (TXDØØ8E	718004)
SUMMARY OF COMMUNICATION		
- Old drym stora	ge closed so the com	vany could
·	A application, then	
<u> </u>	Old drum storage ar	
i	leaned, etc., so the	
•	state the site was	
•	tion lagoon and old a	_
	the only RCRA regula	
	prage tank used to h	
	. Thinner used to	
1 <i>7</i> .	ting greas (parged to	
- All paint lin	nes waste streams go	
same waste	Print MIX building.	
Janks inside	Print MIX building.	
CONCLUSIONS, ACTION TAK	EN OR REQUIRED	
· · · · · · · · · · · · · · · · · · ·		
INFORMATION COPIES TO:		RW

DW0550

TEXAS WATER COMMISSION NOTICE OF REGISTRATION SOLID WASTE MANAGEMENT 04-04-89

THIS IS NOT A PERMIT AND DOES NOT CONSTITUTE AUTHORIZATION OF ANY WASTE MANAGEMENT ACTIVITIES OR FACILITIES LISTED BELOW. REQUIREMENTS FOR SOLID WASTE MANAGEMENT ARE PROVIDED BY TEXAS ADMINISTRATIVE CODE SECTION 335 OF THE RULES OF THE TEXAS WATER COMMISSION (TWC). CHANGES OR ADDITIONS TO WASTE MANAGEMENT METHODS REFERRED TO IN THIS NOTICE REQUIRE WRIT-TEN NOTIFICATION TO THE TWC.

DATE OF NOTICE: 03-03-89

REGISTRATION DATE: 04-12-76

REGISTRATION NUMBER: 30347

EPA I.D. NUMBER: TXD008018004

THE REGISTRATION NUMBER PROVIDES ACCESS TO STORED INFOR-MATION PERTAINING TO YOUR OPERATION. PLEASE REFER TO THAT NUMBER IN ANY CORRESPONDENCE.

COMPANY NAME:

GENERAL MOTORS CORPORATION

MAILING ADDRESS: 2525 EAST ABRAM STREET ARLINGTON, TEXAS

76010

GENERATING SITE LOCATION:

2525 EAST ABRAM ST, ARLINGTON

CONTACT PERSON: PAUL CAIGOY

PHONE: (817) 652-2373

NUMBER OF EMPLOYEES: GREATER THAN 100

TWC DISTRICT: 04

REGISTRATION STATUS: ACTIVE REGISTRATION TYPE: GENERATOR HAZARDOUS WASTE STATUS: SMALL QUANTITY GENERATOR

I. WASTE GENERATED:

WAST		CLASS	CODE	DISPOSITION
001	GARBAGE	11	280160	OFF-SITE
001		11		
002	PAPER TRASH	11	280240	OFF-SITE
Ó03	WOOD/LUMBER SCRAP	111	380200	OFF-SITE
004	PLASTICS	111	380270	OFF-SITE
005	FLOOR SWEEPINGS	111	370760	OFF-SITE
006	PLANT WASTES	111	370770	OFF-SITE
007	CONSTRUCTION DEBRIS AND NON-CO	111	370510	OFF-SITE

2

108320 ON-SITE/OFF-SITE/SOL D FOR RECOVERY

NOTICE OF REGISTR ON (CONTINUED) REGISTRATION NUMBER: 30347 COMPANY NAME: GENERAL MOTORS CORPORATION

MBUSTIBLE WASTE

DESCRIPTIONS):

022 ANTIFREEZE

NT

023

110450 ON-SITE/OFF-SITE/SOL 008 OIL, WASTE - 1 D FOR RECOVERY 009 PLANT RESIDUES 149860 NO LONGER GENERATED 149890 NO LONGER GENERATED 010 BIOLOGICAL SLUDGE, INDUSTRIAL 1 WASTEWATER TREATMENT Oll PAINT SLUDGE, OIL AND/OR IH 950110 ON-SITE/OFF-SITE SOLVENT BASE EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): DOO8 012 SODIUM HYDROXIDE (NAOH) 1 H 970150 ON-SITE/OFF-SITE EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): DOO2, DOO8, DOO5 013 RUBBER 111 380400 OFF-SITE 014 PLASTICS IH 980270 ON-SITE/OFF-SITE EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): DOO1 015 PAINT THINNER 910110 ON-SITE/OFF-SITE ΙH EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): DOO1, FOO3 016 PAINT SLUDGE, PAINT STRIPPING IH 952000 ON-SITE/OFF-SITE EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): DOO1, FOO2 018 ASBESTOS INSULATON 179390 ON-SITE/OFF-SITE - 1 019 ZINC PHOSPHATE BATH SLUDGE 1 . 141710 ON-SITE/OFF-SITE 020 CONTAINERS, EMPTY 179450 ON-SITE/OFF-SITE 021 CONTAINERS, CHEMICAL CONTAMINA IH 979280 ON-SITE/OFF-SITE TED EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR

DEMINERALIZER RESIN BEADS, SPE 11 270131 ON-SITE/OFF-SITE

NOTICE OF REGISTR ION (CONTINUED)

REGISTRATION NUMBER: 30347

GENERAL MOTORS CORPORATION COMPANY NAME:

024 ALCOHOLS

918410 ON-SITE/OFF-SITE/SOL 1H D FOR RECOVERY

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): DOOL

025 FILTER WASTES

973340 ON-SITE/OFF-SITE/SOL 1H D FOR RECOVERY

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): DOO8

026 PAINT WASTE, LIQUID

. 1 110650 ON-SITE/OFF-SITE

027 LINER, CONTAINER, CONTAMINATED II 279200 ON-SITE/OFF-SITE

II. Shipping/Reporting: Pursuant to Section 335 of the Texas Administrative Code of the rules of the TWC pertaining to Hazardous Waste management, issuance of manifests and annual reporting are required for Off-site Storage/Processing/Disposal of the following wastes listed in Part I. All manifested wastes should be reported on the annual waste summary report and submitted to the TWC by the 25th of each January for the prior calendar year.

In addition for any of the following waste(s) manifested and shipped to Storage/Processing/Disposal facilities in any other state a waste shipment summary is required. All such shipments should be reported on the waste shipment summary report and submitted to the TWC no later than the 25th day of the month immediately succeeding the month in which the shipment was made. No waste shipment summary report is required for months when out of state shipments are not made.

800 110450 OIL, WASTE

950110 PAINT SLUDGE, OIL AND/OR SOLVENT BASE

012 970150 SODIUM HYDROXIDE (NAOH)

014 980270 PLASTICS

015 910110 PAINT THINNER

016 952000 PAINT SLUDGE, PAINT STRIPPING

018 179390 ASBESTOS INSULATON

019 141710 ZINC PHOSPHATE BATH SLUDGE

020 179450 CONTAINERS, EMPTY

021 979280 CONTAINERS, CHEMICAL CONTAMINA TED

108320 ANTIFREEZE 022

REGISTRATION NUMBER: 30347

COMPANY NAME: GENERAL MOTORS CORPORATION

024 918410 ALCOHOLS

025 973340 FILTER WASTES

026 110650 PAINT WASTE, LIQUID

. III. ON-SITE WASTE MANAGEMENT FACILITIES:

FAC NO. FACILITY . STATUS

O1 CONTAINER STORAGE AREA ACTIVE STORAGE
OF WASTE NUMBER(S) 008, 011, 012, 014, 016, 018, 019, 020, 021, 022, 023, 024, 025, 026

O2 TANK (SURFACE)
STORAGE FOR LESS THAN 90 DAYS
OF WASTE NUMBER(S) 015
BULK STORAGE TANK, WASTE PURGE THINNER

ACTIVE

O3 MISCELLANEOUS STORAGE CONTAINERS STORAGE OF WASTE NUMBER(S) 027 ROLL-OFF BOXES ACTIVE

UNLESS OTHERWISE STATED ABOVE, FACILITIES ARE LOCATED AT 2525 EAST ABRAM ST, ARLINGTON COUNTY OF TARRANT

IV. RECORDS.

A. FOR PURPOSES OF FILING ANNUAL REPORTS PURSUANT TO TEXAS ADMINISTRATIVE CODE SECTION 335 OF THE RULES OF THE TWO PERTAINING TO INDUSTRIAL SOLID WASTE MANAGEMENT, RECORDS SHOULD BE MAINTAINED FOR STORAGE, PROCESSING AND/OR DISPOSAL OF THE FOLLOWING WASTE(S) LISTED IN PART 1:

008 110450 OIL, WASTE

Oll 950110 PAINT SLUDGE, OIL AND/OR SOLVENT BASE

012 970150 SODIUM HYDROXIDE (NAOH)

014 980270 PLASTICS

015 910110 PAINT THINNER

016 952000 PAINT SLUDGE, PAINT STRIPPING

NOTICE OF REGISTA ION (CONTINUED)

REGISTRATION NUMBER: 30347

COMPANY NAME: GENERAL MOTORS CORPORATION

018 179390 ASBESTOS INSULATON

019 141710 ZINC PHOSPHATE BATH SLUDGE

020 179450 CONTAINERS, EMPTY

021 979280 CONTAINERS, CHEMICAL CONTAMINA TED

022 108320 ANTIFREEZE

024 918410 ALCOHOLS

025 973340 FILTER WASTES

026 110650 PAINT WASTE, LIQUID



Ref. 30

Chevrolet-Pontlac-Canada Group Arlington Plant General Motors Corporation 2525 East Abram Street Arlington, Texas 76010-1390

Sept. 23, 1987

Tim Sewell
TWC - Duncanville
203 James Collins Blvd.
Duncanville, TX 75116

Re: Remedial Action Plan Ground Water Clean-up

Dear Sir:

Refinements to the French drain and air stripper have been completed. On Sept. 22, HDR Infrastructure, inspected and approved the system for operation. The drain's collection system currently requires 1 to 2 weeks to accumulate enough water for treatment by the air stripper. Laboratory analysis of the water will be transmitted to your office upon receipt from the lab.

If you have any questions, please call me at 817/652-2373.

Respectively,

cc B Murday

Paul Caigoy

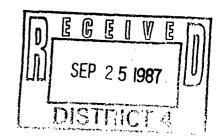
R Lee

R Sobczynski

Industrial Hygienist

C Powell

P Winsborough



RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone CallDiscussionFie ConferenceOther(Specify)	
TO: Gary Tarpley, District Supervisor Texas Parks and Wildlife, Fort Worth, Texas	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/25/89
(817) 831-3128		11:20 AM
SUBJECT: G.M. ASSEMBLY	- PA (TXD008018004)	
SUMMARY OF COMMUNICATION	N	
The area within 4 miles	of the site is urbanized (resident	ial and commercial
development).		
There are no critical ha	abitats for federally listed endang	gered species
within 4 miles of the si	ite.	
There are no sensitive e	environments within 4 miles of the	site.
	,	
		
		jā iz
•		21 30 43
CONCLUSIONS, ACTION TAKE	EN OR REQUIRED	
		
INFORMATION COPIES TO:	,	

EPA FORM 1300-6 (7-72) Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone CallDiscussionFiel ConferenceOther(Specify)	d Trip	
TO: Deborah Edris Secretary, Arlington Chamber of Commerce,	From: $\mathcal{R}\mathcal{W}$ Raymond Wayne, FIT Hydrologist	Date:	6/5/89
Arlington, Texas (817) 275-2613	Raymond wayne, 111 nydrologist	Time:	10:00 AM
SUBJECT: G. M. Assembly	7 - PA (TXD008018004)	_	
SUMMARY OF COMMUNICATION	V		
There are approximately	4,000 employees at the facility.		
-			
			
	-		
CONCLUSIONS, ACTION TAKE	N OR REQUIRED		
		····	
INFORMATION COPIES TO:			

EPA FORM 1300-6 (7-72) Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

50

B. J. Wynne, III, Chairman
Paul Hopkins, Commissioner
John O. Houchins, Commissioner



Allen Beinke, Executive Director Michael E. Field, General Counsel Brenda W. Foster, Chief Clerk

April 13, 1989

CERTIFIED MAIL

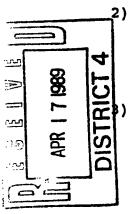
Ms. Joanne Pritcher Environmental Supervisor General Motors Corporation 2525 East Abram St. Arlington, TX 76010-1390

Re: Subsurface Release of Diesel at the General Motors Assembly Plant, 2525 East Abram St, Arlington (Tarrant County), Texas (LUST ID No. 92803)

Dear Mr. Pritcher:

This Office has been made aware of the above-referenced incident through information provided by a field inspection conducted on April 5, 1989 by John Overman and Richard Clark of our District 4 Field Office in Duncanville. The Texas Water Commission (TWC) is responsible for protecting state waters as well as public health and safety from impacts that may result when a release occurs from an underground storage tank system. Section 26.351(b) of the Texas Water Code requires the owner or operator of an underground storage tank system to immediately abate any releases of a regulated substance and remove the resulting contamination. In order to determine the degree of remediation necessary to address this incident, you are requested to perform a contamination assessment study and provide your findings in a detailed report to this Office. This report must include the following information:

 A description of the release including the cause, the volume lost, and all measures taken to abate and contain it.



A determination of the vertical and horizontal extent of subsurface contamination and an account of the procedures utilized to support this determination. The term "subsurface contamination" includes not only the presence of free product, but also any dissolved-product contamination of groundwater and residual contamination of soils.

A site characterization which provides a description of the local soil, geology, and groundwater conditions. If any groundwater is threatened or has already been impacted, you must also provide background water quality information, a water-table gradient map, and a water well inventory. The inventory must locate, on a current

U.S.G.S. topographic map, all water wells within a one-half mile radius of the site and provide all available information pertaining to each well. It is also necessary that you provide copies of all State of Texas Water Well Reports (Form No. WWD-012) for any installed monitor wells as is required under the Texas Water Well Drillers Act.

4) A site map drawn to scale indicating the location of the entire underground storage tank system and all nearby buried utilities, structures, and roads. This map should also provide the location of any excavated areas and the collection points for all soil and water samples.

Laboratory reports providing the results of all sample analyses and a description of sample collection and analytical procedures. Only EPA-approved methods will be accepted for the collection and analysis of samples utilized to determine waste classifications and final cleanup levels.

- An account of the disposition of contaminated soils and water, recovered product, or any associated wastes. If wastes are transported off-site for disposal or recycling, copies of signed receipts from the receiving facility as well as any requested uniform hazardous waste manifests must be included.
- 7) A city or county map depicting the facility's location and photographs documenting observable impacts, excavations, stockpiled soils, and any on-site treatment activities.
- 8) Finally, based upon the results of the assessment, a proposal for the completion of site remediation.

If any evidence exists indicating the presence of free product accumulation in any monitor wells, the tankhold, piping trenches, etc., immediate removal measures must be implemented. Daily observations should be made and appropriate action pursued to ensure that all free product is continuously removed.

Be advised that TWC approval must be granted before you may initiate any on-site treatment to reduce contaminant levels of affected soils and/or water. Additionally, all vapor emissions that might be associated with this release or your response activities must be controlled and monitored to protect human health and safety.

Please note that you are required to notify Mr. Overman of our District 4 Field Office at 214/298-6171 at least forty-eight (48) hours in advance of conducting any significant on-site investigation or remedial activities including the installation of soil borings and/or monitor wells and excavation work.

We request that the completed site assessment study and remediation proposal be provided to this Office no later than forty-five (45) days from the date of this letter. A copy of your response or any

Page 3
April 13, 1989

other correspondence with this Office must be provided to Mr. Overman.

If you have any questions or require guidance regarding this matter, please contact Susie Frizlen of my staff at 512/463-8569. Your cooperation will be appreciated.

Sincerely,

Keith Copeland, Head Corrective Action Unit

Underground Storage Tank Section

SF/bg 92803.cad

cc: John Overman, TWC District 4 Field Office (1019 N. Duncanville Road, Duncanville, Texas 75116-2201)

SOIL SURVEY OF

Tarrant County, Texas



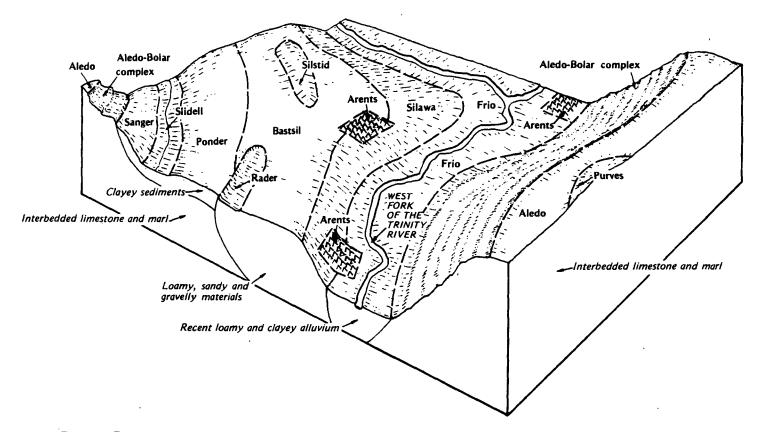


Figure 1.—Typical pattern of soils along the West Fork of the Trinity River. Parts of general soil map units 3, 5, 6, and 7 are represented.

general nature of the county

This section provides general information on the history and settlement, and climate of Tarrant County.

history and settlement

The Tarrant County area was included in Peters' Colony. The first settlement was made about 1840 at Bird's Fort. At that time, this settlement was the western edge of the frontier. In 1841, M.T. Johnson settled at Mary Le Bone Springs, about three miles south of the present Arlington City Hall, and founded Johnson Station. Soon a few other families settled in the area. Sam Houston, the first President of the Republic of Texas, made a treaty with the regional Indians at Bird's Fort in 1843. In 1849, Major Ripley A. Arnold selected a site for a fort on a high bluff overlooking the West Fork of the Trinity River. This fort was named for General William J. Worth.

Tarrant County was formed in 1849 from a northern part of Navarro County and was named for General Edward H. Tarrant. The county was organized in 1850.

Birdville, the largest settlement, was made the county seat. The military post at Fort Worth was abandoned in 1853, but the surrounding village grew rapidly. In 1856, after much contesting, the county seat was moved to Fort Worth.

The population of Tarrant County has rapidly increased. It is now the fourth most populated county in Texas.

climate

Table 1 gives data on temperature and precipitation for the survey area as recorded in Tarrant County in the period 1938 to 1977. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

Tarrant County has a subtropical climate with humid, hot summers. The climate is also continental, characterized by a wide range in annual temperature extremes. Winters are mild, but "northers" occur about three times each month, and often are accompanied by sudden drops in temperature. Periods of extreme cold occasionally occur but are short-lived; so that even in

January, mild weather occurs frequently. In an average year, temperature minima of 20 degrees or below occur on only six days.

The highest temperatures in summer are associated with fair skies, westerly winds, and low humidities. Characteristically, hot spells in summer are broken into three- to five-day periods by thunderstorm activity. There are only a few nights each summer when the minimum temperature exceeds 80 degrees, but a year when the temperature does not exceed 100 degrees is rare.

In winter the average temperature is 47 degrees F, and the average daily minimum temperature is 37 degrees. The lowest temperature on record, which occurred at Fort Worth in February 1899, is -8 degrees. In summer the average temperature is 83 degrees, and the average daily maximum temperature is 94 degrees. The highest recorded temperature, which occurred at Fort Worth on June 26 and 27, 1980, is 113 degrees.

Throughout the year, rainfall occurs more frequently during the night. Usually, periods of rainy weather last for only a day or two, and are followed by several days of fair skies. A large part of the annual precipitation results the bunderstorm activity, with occasional heavy rainfall are periods of time. Greatest amounts of rain aduring the months of April and May. July and August are relatively dry months. Thunderstorms occur throughout the year but are most frequent in the spring. Hail falls on about two or three days a year and mostly causes only slight and scattered damage. Windstorms occurring during thunderstorm activity, however, are sometimes destructive.

The total annual precipitation is 32.1 inches. Of this, 19 inches, or 59 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 11 inches. The heaviest 1-day rainfall during the period of record was 9.57 inches at Fort Worth on September 1932. Thunderstorms occur on about 44 days each year, and most occur in spring.

The average length of the warm season (freeze-free period) is 249 days. Since 1940, the longest freeze-free period was 292 days in 1973, and the shortest was 196 days in 1946. The average date of the last occurrence of 32 degrees or below is March 16. During the period 1940-1970, the earliest occurrence was February 14, 1946, and the latest was April 13, 1957. The average date of the first occurrence of 32 degrees or below in the fall is November 21. During the period 1940-1970, the earliest occurrence was October 27, 1957, and the latest was January 4, 1972.

Snowfall is common. In 72 percent of the winters, there is measurable snowfall. In 23 percent, the snowfall, usually of short duration, is more than 5 inches. The heaviest 1-month snowfall on record was more than 12 inches.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 81 percent. The sun shines 76 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 14 miles per hour, in March and April.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, rangeland managers, engineers, planners, developers and builders, home buyers, and others.

This complex is not in a capability subclass or range site.

80—Trinity clay, frequently flooded. This deep, nearly level, clayey soil is on flood plains of major streams. It is flooded once every year to once every two years. Flooding lasts from several hours to one day. Areas are long and broad and parallel the stream channel. They range from 20 to about 1,500 acres. Slopes range from 0 to 1 percent.

Typically, this soil is moderately alkaline, dark gray clay to a depth of 63 inches. It has very dark grayish

brown mottles below a depth of 32 inches.

This soil is somewhat poorly drained. Permeability is very slow, and available water capacity is high. Runoff is very slow, and the hazard of erosion is slight. When the soil is dry, deep, wide cracks form at the surface. Water ponds on the surface for a few hours following rains. The root zone is deep, but plant roots slowly penetrate the clayey material.

Included with this soil in mapping are small areas of Ovan soils and areas of Trinity soils that have as much as 10 inches of dark grayish brown overwash deposited on the surface. The included soils make up as much as

30 percent of a mapped area.

This soil is used mainly as pastureland and is well suited to this use. Adapted pasture plants commonly grown are improved bermudagrass, tall fescuegrass, indiangrass, switchgrass, kleingrass, johnsongrass, sweetclover, and singletary peas. Fertilization, weed control, and controlled grazing are pasture management objectives.

The hazard of flooding is the main limitation for use as cropland and for urban and recreation uses. This limitation can be overcome only by major flood control. Wetness, very slow permeability, and the clay texture throughout that causes deep, wide cracks to form when the soil is dry and causes stickiness when the soil is wet are also limitations for urban and recreation uses.

Areas of this map unit are excellent for wildlife habitat. These areas furnish cover, food, and nesting for many songbirds, quail, doves, rabbits, squirrels, raccoons, and deer.

This soil is in capability subclass Vw and the Clayey Bottomland range site.

81—Urban land. This unit consists of areas that are 85 to 100 percent works and structures, such as office buildings, hotels, railroad yards, airports, multiple-unit dwellings, shopping centers, churches, schools, streets, sidewalks, and paved parking lots. Most of the sales, service, banking, professional, educational, entertainment, and governmental functions of the cities are concentrated in these areas.

Most of the rainfall in those areas runs off and reaches major drains rapidly.

Included in mapping are some built-up areas on which buildings and structures cover less than 85 percent of

the surface. Also included are small areas of soils that have been covered by fill material. These included areas make up as much as 20 percent of the mapped areas.

The soils that make up Urban land have been altered and obscured to the extent that they can not be classified.

This map unit is not in a capability subclass or range site.

82—Weatherford fine sandy loam, 3 to 8 percent slopes. This deep, gently sloping and sloping soil is on slopes above drainageways. Areas follow the contour of slope and are longer than they are wide. They range from 10 to about 120 acres. Slopes are convex and average about 5 percent.

Typically, the surface layer is brownish fine sandy loam about 6 inches thick. The subsoil, from a depth of 6 to about 51 inches, is sandy clay loam. It is reddish in the upper part and yellowish in the lower part. Below that is stratified pink and white packsand and weakly cemented sandstone. Reaction typically is neutral in the upper part of the soil and medium acid in the lower part.

This soil is well drained. Permeability is moderate, and available water capacity is medium. Runoff is medium, and the hazard of erosion is severe. Areas that are bare of vegetation are subject to soil blowing. This soil is easy to work throughout a wide range of moisture conditions. The root zone is deep, and plant roots can easily penetrate the lower layers.

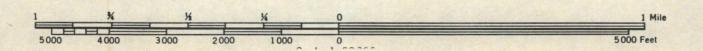
Included with this soil in mapping are small areas of Selden soils on lower slopes and Windthorst soils on upper slopes and ridges. A few areas of eroded Weatherford soils, from which most of the surface layer has been removed, are included. A few uncrossable gullies are present in some areas. These included soils make up as much as 20 percent of any mapped area.

This Weatherford soil is mainly used as pastureland and rangeland. It is moderately suited to use as pastureland. Improved bermudagrass, kleingrass, weeping lovegrass, indiangrass, switchgrass, vetch, and arrowleaf clover are commonly grown. Proper pasture management includes fertilization, weed control, and

controlled grazing.

This soil is moderately suited to use as cropland. Low natural fertility and runoff are limitations for production. Management concerns are controlling water erosion and soil blowing and improving soil tilth. Terracing and farming on the contour help to slow runoff and to reduce erosion. Grassed waterways are needed to stabilize terrace outlets. Leaving crop residue on the surface and growing cool season legumes help to slow runoff, improve soil tilth, and control soil blowing.

The Weatherford soil is well suited to most urban and recreation uses. Low strength affecting streets and roads and slope are the main limitations. Good design and careful installation can easily overcome these limitations. Areas left bare of vegetation during construction are easily erodible. Slope is a limitation for using this soil for playgrounds.



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U.S. ENVIRONMENTAL PROTECTION AGENCY HAZARDOUS WASTE PERMIT APPLICATION Consolidated Permits Program (This information is required under Section 3005 of RCRA.)

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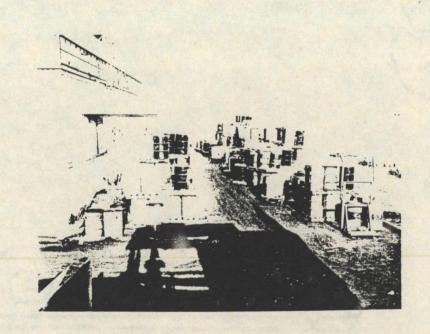
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Form Approved OMB No. 158-\$80004

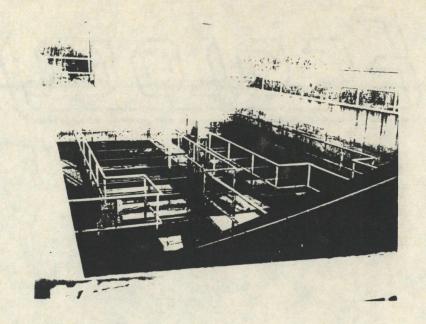
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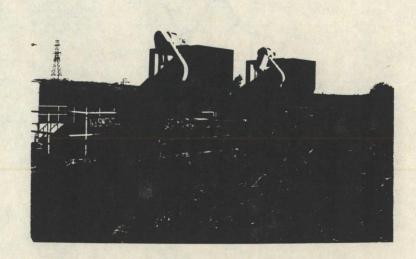
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